Merging verb cluster variation

Sjef Barbiers
Universiteit Leiden

Hans Bennis
Nederlandse Taalunie

Lotte Dros-Hendriks
Meertens Instituut

Abstract: In this paper we argue that verb clusters in Dutch varieties are merged and linearized in fully ascending (1-2-3) or fully descending (3-2-1) orders. We argue that verb clusters that deviate from these orders involve non-verbal material: adjectival participles, or nominal infinitives. As a result, our approach does not involve any unmotivated movements that are specific for verb clusters.

Support for our analysis comes from (i) the interpretation of verb clusters; (ii) the fact that order variation depends on the types of verbs involved, which can be explained by selectional requirements of the verbs; and (iii) the geographic co-occurrence patterns of various orders. First, the 1-3-2 and 3-1-2 orders are argued to be ascending orders with a non-verbal 3. Indeed these orders occur in grammars that have ascending, rather than descending, verb clusters. Secondly, the 1-3-2 order is argued to be an interrupted V1-V2 cluster with a non-verbal 3. Indeed, this order is most common in the region where non-verbal material can interrupt the verb cluster.

Our analysis of word order variation in verb clusters in terms of principles of grammar is further supported by an experiment in which we asked a large number of speakers distributed over the Dutch language area to rank all logicaly possible orders, including orders that are not common in their own variety of Dutch. The results demonstrate that speakers apply their syntactic knowledge to rank verb cluster orders that they do not use themselves. We argue that this knowledge cannot be due to familiarity with the various orders.

Keywords: verb clusters, base-generation, merge, language variation, adjectival participles, nominal infinitives, particles, geographic distribution.

1. *Introduction*[1]

As is clear from the Syntactic Atlas of the Dutch Dialects (SAND I & II, Barbiers et al. 2005/2008) variation in word order in Dutch dialects is a rather infrequent phenomenon. Most variation is found in the domain of morphosyntax, and thus relates to variation in form rather than in order. In those cases the form of a particular word varies across dialects. Well-known examples concern subject pronouns, relative pronouns, complementizers and verbal inflection (cf. SAND I). Another issue that has been discussed in the literature quite extensively (cf. Barbiers 2008 for an overview) is the phenomenon of syntactic doubling, often found in situations in which both positions are independently available, as for instance in the case of relative pronoun doubling, as in *Dit is de man* ***die*** *ik denk* ***die*** *ze gezien hebben* ('This is the man REL.PRON. I think REL.PRON. they saw'). Generally there exists a non-doubling variant. In this specific case, the second relative pronoun can be replaced by the complementizer *dat*. In doubling constructions it is not word order that varies, but the spell-out of (multiple) positions in a movement chain.

Compared to morphosyntactic variation, the word order we find within the Dutch language area is remarkably constant. For instance, all 267 dialects that are part of the SAND-research show exactly the same pattern for the placement of the finite verb. There is no variation with respect to Verb Second, although the placement of the finite verb is variable cross-linguistically, as is clear from the vast literature on Verb Movement in for instance Germanic and Romance languages. Similarly, although there is much cross-linguistic variation in the ordering of verbs and objects, all Dutch dialects have the verb following the object in subordinate clauses. Without exception, Dutch dialects have OV-order and move the finite verb to the beginning of

the clause in clauses without a complementizer. Similarly, the order in nominal phrases is rather strict. There is for instance no dialectal variation in the position of the adjective in the nominal phrase. It always precedes the noun and is preceded by the determiner. This is by no means the 'logical order' in nominal phrases, given that other Germanic languages (Scandinavian) and Romance languages (e.g. French) show different orders in the nominal domain. It is thus remarkable that the DP-order is constant across varieties of Dutch.

However, there is one domain in which word order variation is abundant. This concerns the famous verb raising phenomenon in Dutch (and German). If we find more than one verb at the end of the clause, for instance a main verb and one or more auxiliary or modal verbs, the order appears to be unstable across dialects. In a subordinate clause in which the main verb is accompanied by two modals, we find four orders (out of six logically possible orders). This is shown in (1).

(1) a. Ik vind dat iedereen *moet kunnen zwemmen.* V1-V2-V3
I find that everyone must can swim
'I think that everybody should be able to swim.'

b. Ik vind dat iedereen *moet zwemmen kunnen.* V1-V3-V2

c. Ik vind dat iedereen *zwemmen kunnen moet.* V3-V2-V1

d. Ik vind dat iedereen *zwemmen moet kunnen.* V3-V1-V2

As far as we know, there are no clear semantic and pragmatic differences between these sentences. Although there seem to be differences in stylistic preferences (see Coussé 2008, and references cited therein), there seems to be no difference in meaning whatsoever. The different orders found in verb clusters appear to be determined by:

(2) (i) geographical location of the dialect

(ii) type of the auxiliaries in the verbal cluster

(iii) hierarchy of auxiliaries in the verbal cluster

Most often speakers of Dutch are not aware of word order differences of this type. Superficially, it appears to be rather arbitrary to select one of these orders. However, as we will show in this article, there is a clear syntactic system that determines the order and the variation in word order possibilities. It is our goal to present an explanation of this variation. Moreover, we will show that speakers know this variation unconsciously.

There is a vast literature on verb cluster formation and the variation in order of the verbs in clusters, starting with the seminal publication of Arnold Evers in (1975).[2] We will touch upon this literature in this article, but we do not intend to present a comprehensive overview of the different proposals that have been put forward in the past (cf. Wurmbrand 2006, to appear-1 for overviews). Our approach differs from most of the other literature in at least three respects.

- First of all, our analysis takes dialect geography as a starting point. We will concentrate on the variation we find at different locations to see if there are particular co-occurrence patterns that might help us to understand the phenomenon of verb clustering. This part of the paper builds on Barbiers & Bennis (2010).
- Secondly, we present an analysis without movement operations of the type Verb Raising (rightward head movement) or VP-intraposition (leftward XP-movement). We analyse the structure of verb clusters differently in terms of three properties. (i) Verb clusters depict base-generated (i.e. externally merged) orders. (ii) The linearization within the VP is unidirectional. As a consequence, only the 1-2-3 and 3-2-1 orders involve three-verb

clusters. (iii) The categorial status of the elements involved in the cluster can differ. More specifically: verbs can be reanalyzed as adjectives or nouns. We will argue that this is the case in the 1-3-2, 3-1-2 and 2-3-1 orders.

- Last but not least, we will demonstrate that the intuitions speakers have of the various orders in verbal clusters, even with respect to cluster orders they don't produce themselves, correlate with the patterns we find within the Dutch speaking area. We argue that this must be due to their syntactic knowledge and cannot be due to familiarity with the various orders.

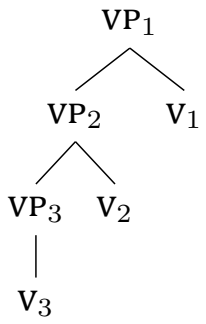
2. *Verb cluster formation*

We will assume that a verbal cluster is built through the operation of Merge. In a two-verb cluster, the projection of the main verb [VP2] is merged with an auxiliary verb [V1], thereby creating a verbal cluster [VP1]. However, Merge is not an operation that forces the auxiliary to be ordered with respect to the main verb. It thus allows both orders [$_{VP1}$ V1 VP2] and [$_{VP1}$ VP2 V1] to be formed. In order to account for the word order variation we have to find subsidiary principles that determine the order within the verb cluster and that allow variation in word order to occur. In order to be able to determine what the properties of such principles are, we have to look at the formation of more complex verb clusters.

Before going into a more detailed study of the data, we will briefly compare our base-generation approach with other approaches that have been discussed in the literature from a more theoretical perspective.[3] There are lots of proposals around, but three major types of proposals can be distinguished: head movement of the verb to the right (Verb Raising), VP-movement to the left (VP-intraposition), and base-generation.

Traditionally, Dutch has been argued to be an SOV-language with Verb Second in main clauses. In a strict OV-approach the underlying order of a clause with a verb cluster that consists of three verbs is [[[... V3] V2] V1], structurally represented in (3).

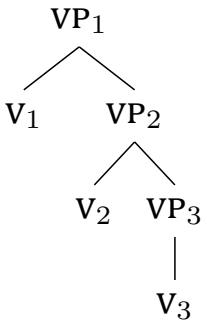
(3)



Verb clusters may then be analysed as the result of head-movement of the verbs. V3 moves through adjunction to V2 and the complex V2-V3 (or V3-V2) is adjoined to V1. An approach along these lines has been proposed by Evers (1975) and many others. The head movement rule is called Verb Raising (VR). It raises the lower verb to the higher one, thereby possibly changing their order. The resulting complex may then be moved by Verb Raising again to the next verb. And so on.

Another approach comes from those linguists that take languages to be uniformly SVO, as a consequence of the theory of antisymmetry, introduced by Kayne (1994) (See Zwart 1993). This implies that the underlying order is [V1 [V2 [V3 ...]]], as in (4).

(4)



In this type of analysis, VPs move to the left through VP-intraposition. VP3 moves leftward to VP2, and the resulting cluster then moves to VP1.

Base-generating verb clusters might be the simplest way to derive variation in the orders of verbs in a cluster, as also argued by Barbiers (2002, 2005). Such an approach is taken by Wurmbrand (2004), Abels (2011) and Salzmann (2011), among others, who argue that the 1-2-3, 3-2-1, 1-3-2 and 2-3-1 orders can be base-generated while keeping the embedding relations constant (this will be thoroughly illustrated in section 4). Those analyses require some sort of mechanism to account for the observed 3-1-2 order, such as movement of V3. We will instead argue that only the 1-2-3 and the 3-2-1 orders involve base-generated three-verb clusters. The 1-3-2, 3-1-2 and 2-3-1 orders involve a reanalysis of V3 or [V2-V3] as nominal or adjectival. As a consequence, our approach does not involve any movements that are specific for verb clusters. A further advantage of our approach comes from the 1-3-2 order, which in our approach, involves a nonverbal 3. This can account for the fact that this order is particularly frequent in those areas where nonverbal material can interrupt the verb cluster. This geographic pattern will be the topic of section 6.

Another base-generation approach to verb clusters is presented by Williams (2003) and Bader & Schmid (2009). In their approach variation is found in the level and direction of selectional restrictions. For example, as Bader & Schmid demonstrate, the 3-1-2 order in *lesen hat wollen* 'read had want' can be derived by assuming that V1, a tense auxiliary, selects V2 to its right, while V2, a modal auxiliary, selects V3 to the left. The level of the selectional restrictions of V2 is the node dominating V1 and V2. It is this node that selects V3 to its left. While this approach hence does not require any unmotivated movements, it can also not account for the geographic co-occurrence patterns in the 1-3-2 order and interrupted verb clusters. Differently from Williams (2003) and Bader & Schmid (2009), we do not argue that direction of selection

can differ for each verb type. Rather, we argue that the direction of linearization is uniform in the verbal domain.

Our base-generation approach is different from the movement approaches in various ways.
First of all, we do not need specific movement rules for the formation of verb clusters. In our perspective, movement is not involved in the building of verb clusters. There is no rule of Verb Raising in the sense of Evers (1975) or VP-intraposition in an antisymmetric system. The relevant structures are generated by the (successive) application of Merge. A recurrent problem for the movement approach is the lack of motivation for these movements (cf. a.o. Chomsky 2001).[4] There appear to be no triggers for movement, neither morphosyntactically nor semantically. Different orders in a cluster vary in the order of verbs only, not in the form or the interpretation of the cluster. There is no effect on pragmatics or scope either. Given that a minimalist approach to movement presupposes a trigger for the movement, often represented as feature checking, this causes a theoretical problem. Chomsky explicitly argues that V-movement should be part of the phonological component. We argue that there is no syntactic or phonological movement in the formation of verbal clusters.[5]
A further argument for an account in which the verb cluster is base-generated through Merge is the fact that the whole cluster can be the object of nominalization, as in (5).

(5) Het moeten$_1$ kunnen$_2$ eten$_3$ van een koekje
the must can eat of a cookie
'the obligation to be able to eat a cookie'

In a movement approach the internal structure of a complex nominalization requires that these complex nouns can be derived from syntactically derived clusters after movement. In our

approach the generated verb projection is only recategorized as a noun, as is the usual approach to the derivation of nominalizations.

So we conclude that there are no syntactic, semantic, morphological or pragmatic reasons to consider a verb cluster to be the result of a complex structure that is affected by V(P)-movement. The verb cluster is the consequence of merging a verb with a verb projection. As the verb cluster constitutes a complex verb, arguments of lower verbs can be selected by the entire verb cluster, see section 5.2.[6]

Two-verb clusters thus involve the binary merge of a verb with a verb projection in narrow syntax. The result of this operation can be merged with another verb to construct a three-verb cluster. This operation does not force any specific ordering of the elements involved. The result of this process is linearized post-syntactically. We will argue that restrictions on linearization prohibit the occurrence of certain verb orders. More specifically, we will argue that linearization is unidirectional within a particular domain. As a consequence, only the 1-2-3 and 3-2-1 orders involve three-verb clusters.

3. *Two-verb clusters*

Let us turn to the variation in word order we find in verb clusters in Dutch. Even in the case of clusters in which the main verb is accompanied by one auxiliary verb, we find geographical differences. Take the following two sentences in (6) – these are sentences from the SAND –, one in which the auxiliary is a modal verb (6a) and another one in which the main verb in the subordinate clause is dominated by a perfect auxiliary (6b).

(6) a. ... ik vind dat jij het ook niet *mag zien / zien mag.*

... I find that you it also not may see

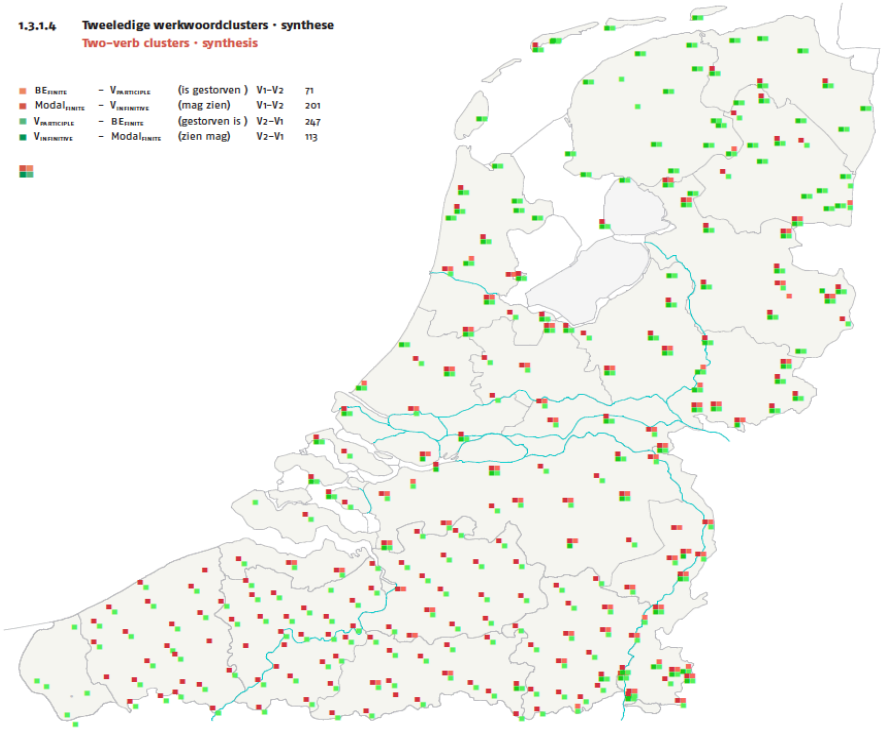
'... I think that you should not see it either.'

b. Ze weet niet dat Marie gisteren *gestorven is / is gestorven.*

She knows not that Marie yesterday died is

'She does not know that Marie died yesterday.'

As is indicated on map 1, the main verb may either precede or follow the auxiliary, but there are clear patterns in distribution.



Map 1 (= SAND-II map 16)

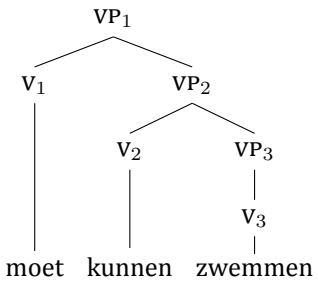
In the northern part of the country we predominantly find the order Main Verb - Auxiliary, or rather V2-V1. In the southern part we find a distinction, which is related to the nature of V1. If V1 is a perfect auxiliary verb and the main verb a participle, the order is V2-V1, but if V1 is a

modal, the order is V1-V2. In the remainder of the language area the situation is somewhat unclear.[7] We thus see that both geography (2i) and type of the auxiliary (2ii) determine the distribution of word order.

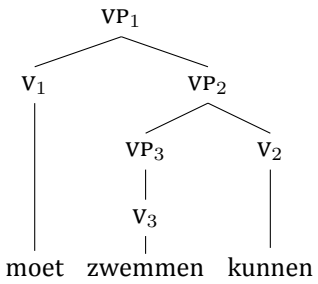
We can easily derive these orders by Merge, assuming that Merge does not imply a specific order within the complex constituent that is created. However, we need to find independent argumentation to account for the different order possibilities across varieties of Dutch. In order to do so, we have to look at more complex verb clusters. There are SAND-data (SAND-II, Barbiers et al. (2008), chapter 1) for verb clusters with three verbs. We will discuss these in the next section.

4. *Three-verb clusters*

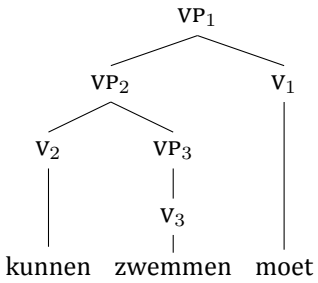
If we take Merge to be the verb cluster building machine, we make the prediction for three-verb clusters that only four out of the logically possible six orderings can be generated. Let us look at the different possibilities. At first, the projection of the main verb [VP3] is merged with the auxiliary verb that directly dominates the main verb [V2], either a modal or a perfect auxiliary. That is basically the situation as we have established for verb clusters with two verbs. We thus build [$_{VP2}$ V2 VP3] and [$_{VP2}$ VP3 V2]. If we now merge another auxiliary verb, the highest one [V1] – an auxiliary that selects the already built cluster interpretatively –, we arrive at four possible orders: [$_{VP1}$ V1 [$_{VP2}$ V2 VP3]] - [$_{VP1}$ [$_{VP2}$ V2 VP3] V1] and [$_{VP1}$ V1 [$_{VP2}$ VP3 V2]] - [$_{VP1}$ [$_{VP2}$ VP3 V2] V1]. In structure:

(7) a. 

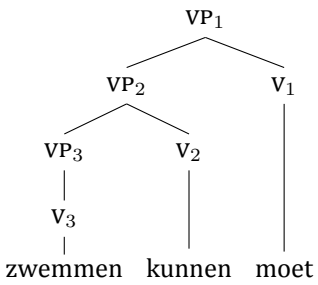
= 1-2-3

b. 

= 1-3-2

c. 

= 2-3-1

d. 

= 3-2-1

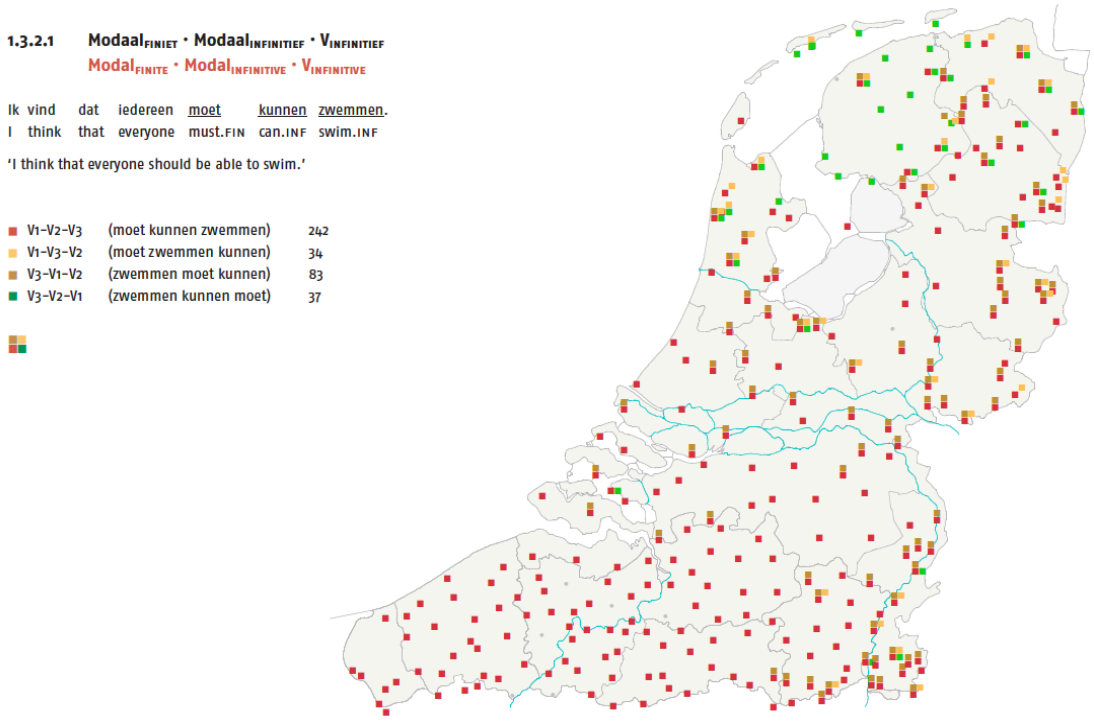
Given common assumptions on the operation of Merge, such as binarity, the orders V2-V1-V3 and V3-V1-V2 cannot be generated through Merge. We cannot generate a structure in which V1 breaks up the cluster [$_{VP2}$ V2 V3] or [$_{VP2}$ V3 V2] that was built in the first Merge operation. This leads to the prediction in (8).

(8) In 3V-clusters the orders V2-V1-V3 and V3-V1-V2 are impossible

Let us now look at the empirical facts of verb clusters with three verbs in dialects of Dutch.

4.1 *Clusters with two modal auxiliaries*

In the SAND-atlas we find a sentence with two modals and a main verb in a subordinate clause. The sentence was already given in (1): *Ik vind dat iedereen goed moet kunnen zwemmen*. We show the geographical distribution of the orders that were found in the verbal cluster for this sentence on map 2.



Map 2 (= SAND-II map 17a)

The results are given in (9).

(9) i. V2-V1-V3 is absent;

ii. V2-V3-V1 is absent as well;

iii. V1-V2-V3 is found in the whole language area with the exclusion of Friesland;

iv. V3-V2-V1 is typical for the northern part of the langue area and hardly occurs anywhere else;

v. V3-V1-V2 is found throughout the Netherlands part of the language area, but never as the only order that is found in a particular location, almost always as a variant of the much more frequent V1-V2-V3 order. We may call V3-V1-V2 a secondary order;

vi. V1-V3-V2 is the least frequent order that is found mostly along the eastern border. It is never found as the only available order. Most often it occurs in combination with both V1-V2-V3 and V3-V1-V2. We may call this a secondary order as well;

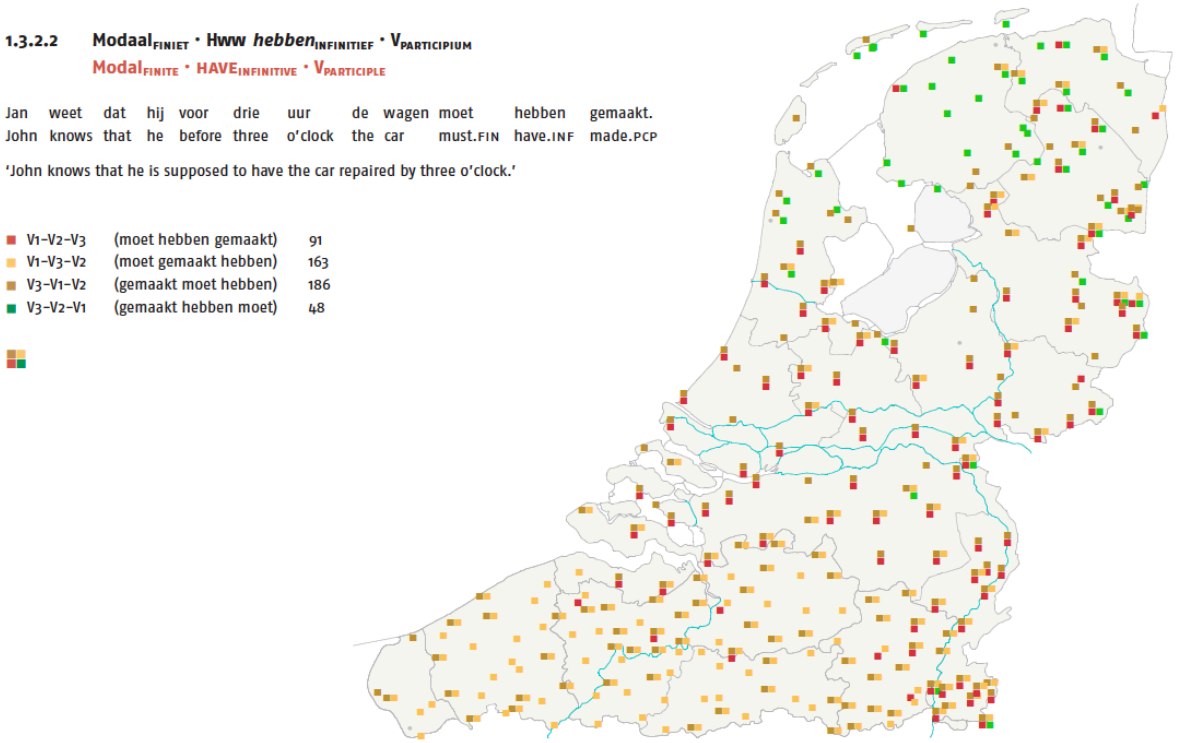
vii. There are many dialects that have 2, 3 and even 4 orders for this type of 3V-cluster.

4.2 *Clusters with a modal auxiliary and a perfect auxiliary*

The sentence with a modal and a perfect auxiliary used as a test sentence in the SAND-project is given in (10).

(10) Ik vind dat Jan de wagen voor drie uur *moet*$_1$ *hebben*$_2$ *gemaakt*$_3$.
I find that Jan the car before three hour must have made
'I think that John must have repaired the car before three o'clock.'

The distribution of the orders in the verb cluster in (9) is given on map 3.



Map 3 (= SAND-II map 17b)

The distribution of verbs within the cluster with a modal verb that selects a perfect auxiliary and a main verb shows the properties in (11).

(11) i. V2-V1-V3 is absent;

ii. V2-V3-V1 is absent as well;

iii. V1-V3-V2 is the dominant order in the Belgian part of the language area;

iv. V3-V2-V1 is the typical order in the northern part of the language area;

v. V1-V2-V3 is restricted to the Netherlands part of the language area. It is never the only order in a particular location;

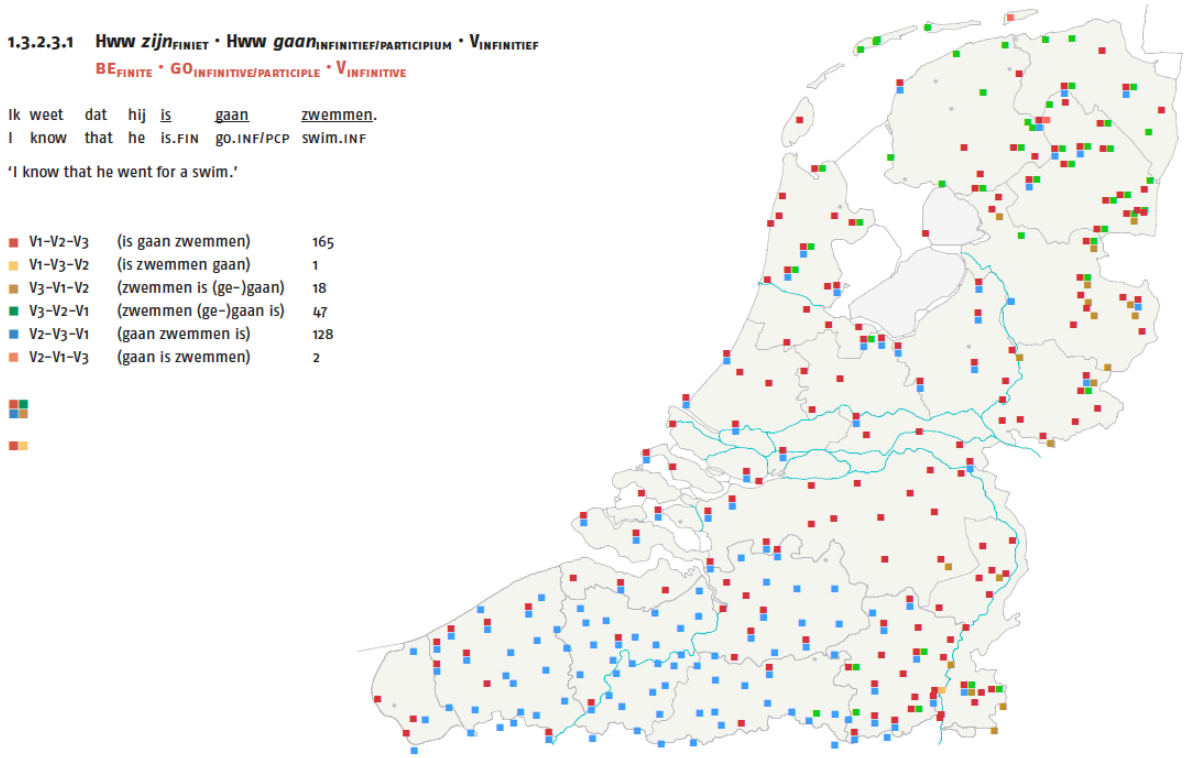
vi. V3-V1-V2 is found in the whole language area except Friesland. It is the most frequent order and often occurs as the only order in specific dialects.

4.3 *Clusters with a perfect auxiliary and an aspectual auxiliary*

In 4.2 we presented the distribution of a cluster in which the modal verb selects a perfect auxiliary. Here the order is reversed, the perfect auxiliary selects a modal/aspectual auxiliary *gaan* 'go'. In the SAND-project, we used the sentence in (12) as a test sentence for this type of construction.[8]

(12) Ik weet dat hij is$_1$ gaan$_2$ zwemmen$_3$.
I know that he is go swim
'I know that he went swimming.'

The distribution of the orders in the verb cluster in (11) is given on map 4.



Map 4 (= SAND-II map 18a)

The distribution of verbs within the cluster that consist out of a perfect auxiliary selecting an aspectual auxiliary and a main verb shows the properties in (13).

(13) i. V2-V1-V3 is absent;[9]

ii. V3-V1-V2 occurs in 18 locations in the eastern part of the language area.[10]

iii. V1-V3-V2 is absent as well;[11]

iv. V1-V2-V3 is the most frequent order, in particular in the Netherlands part of the language area;

v. V2-V3-V1 is an order that is found in the Belgium part of the language area in particular;

vi. V3-V2-V1 is the dominant order in the northern part of the language area.

4.4 *A comparison of the three types of 3-verb clusters*

There are several conclusions that can be drawn from a comparison of the data in 4.1-4.3:

(14) i. V2-V1-V3 does not occur;[12]

ii. V1-V2-V3 occurs frequently in all three constructions, especially in the Netherlands area;

iii. V3-V2-V1 is basically confined to the northern part of the language area. In that area it occurs in all three constructions;

iv. V2-V3-V1 only appears in ASP_2-V_3-$PERF_1$ (4.3). It is excluded in the other two;

v. V1-V3-V2 is frequent in MOD_1-V_3-$PERF_2$ (4.2), infrequent in MOD_1-V_3-MOD_2 (4.1), and absent in $PERF_1$-V_3-ASP_2 (4.3);

vi. V3-V1-V2 is frequent in V_3-MOD_1-$PERF_2$ (4.2), occurs regularly in V-MOD-MOD (4.1), and sporadically in V_3-$PERF_1$-ASP_2 (4.3).

5. *The analysis of the order in the verb cluster*

Below we present an analysis of the empirical generalizations above. We will try to argue that they follow from properties of Merge in combination with parameters, which are related to linearization, the categorial status of participles and the categorial status of infinitives.

5.1 *The order V2-V1-V3 does not exist (14i)*

The fact that the order V2-V1-V3 does not occur in any of the constructions discussed above can be explained by the fact that this order cannot be derived through merge, as was shown in section 4. The fact that this order is impossible has been observed in the literature (Zwart 1996, a.o.). There have been two different derivational approaches to account for this.

In the VR-approach, a three-verb cluster is considered to involve adjunction of V3 to V2, followed by the adjunction of the [V2 V3]-cluster to V1. In this approach, the most obvious way to create V2-V1-V3 would be to raise the lowest verb in one step to the right of the highest verb, thereby violating minimality. It thus appears to follow from the OV plus VR approach that the order V2-V1-V3 cannot be derived. In order to create a V2-V1-V3 cluster in the antisymmetric approach, the VP2 has to move to the left of VP1 without taking along VP3.[13] The impossibility of V2-V1-V3 does not distinguish between the three approaches to verb clusters.

5.2 *The order V3-V1-V2 does not exist (14vi)*

Our proposal excludes the order V3-V1-V2. The reason that this order is impossible is similar to the exclusion of V2-V1-V3: if we derive cluster orders through Merge, V2 and V3 have to be adjacent. The head raising analysis predicts that this order exists if we allow V2 to move to V1 without moving V3. This is not an instance of a minimality violation. In the other approach, V3-V1-V2 can be derived simply by moving VP3 across V2 and V1.

We have seen above that the order V3-V1-V2 indeed does occur in the three constructions discussed above, and quite frequently in two of these. This seems to be a serious problem. We either have to give up the base-generation approach adopted or we need to provide an explanation for these counterexamples. We will show in this section that indeed the order V3-V1-V2 does not exist and that apparent counterexamples should be analyzed as instances of different structures.

The order V3-V1-V2 frequently occurs in the construction in which the main verb is a participle (4.2). With the exception of the northern provinces, this order can be found in the whole language area. We know that participles are ambiguous with respect to their categorial status. They show up in verbal or adjectival contexts. Participles appear in attributive position in noun phrases, in contrast to infinitival verbs. The noun phrase *de verslagen.PCP vijan*d 'the beaten enemy' is perfectly fine, but the noun phrase *de verslaan.INF vijand* 'the beat enemy' is ungrammatical.[14] In some cases there is an interpretative difference between adjectival and verbal participles (a.o. Kraak & Klooster 1968: 149-159). A participle such as *geopend* can be interpreted as 'open' or 'has been opened'. In a verb cluster as in (15a, [V2-V1]), the participle

indeed allows both meanings of *geopend*. However, in the other order (15b, [V1-V2]) the participle can only be interpreted as verbal, with the interpretation 'has been opened'.

(15) a. Hij zag dat de deur *geopend*$_2$ *is*$_1$.
He saw that the door opened is
'He saw that the door has been opened / is open.'

b. Hij zag dat de deur *is*$_1$ *geopend*$_2$.
'He saw that the door has been opened / *is open.'

c. de geopende deur
'the open door / the door that has been opened'

Participles in attributive position within nominal phrases allow both interpretations, as is demonstrated in (15c). Apparently an adjectival position of the participle allows a verbal, passive interpretation ('has been opened') and an adjectival, stative ('open') interpretation.[15] The fact that only the passive interpretation is available in (15b) can be accounted for by assuming that the participle in (15b) is verbal rather than adjectival, thereby excluding the stative interpretation ('open'). Given that both interpretations are available in (15a) we conclude that the participle in cluster-initial position can be adjectival or verbal, just as in (15c). The difference in interpretation between (15a) and (15b) is thus related to a categorial difference. In (15a) the participle is or may be adjectival, whereas it has to be verbal in (15b). This is supported by restrictions on modification, e.g. the durative adverbial *de hele dag* 'the whole day' is possible with the adjectival variant of (15a) but not easily with the verbal variant in (15b).[16]

The adjectival properties of participles have also been observed for present participles by Bennis & Wehrmann (1990) and for past participles by Evers (2003), Koeneman et al. (2011)

and others. Similar to our proposal, Koeneman et al. (2011) argue that participles can be adjectival. They demonstrate that the participle *gestolen* 'stolen' in so-called *perfect doubling* constructions has to precede the other verbs, indicating that this participle has to be adjectival in such constructions.

(16) a. ...dat ik zijn fiets gestolen.PCP_3 gehad.PCP_2 heb_1. (South-Eastern Dutch)
...that I his bike stolen had have

b. ...dat ik zijn fiets gestolen.PCP_3 heb_1 gehad.PCP_2.
...that I his bike stolen have had
'that I had stolen his bike.'

c. *...dat ik zijn fiets heb_1 gehad.PCP_2 gestolen.PCP_3.
...that I his bike have had stolen

Koeneman et al. adopt the idea that participles can become adjectival through merger with an abstract adjectival head (cf. Lieber (1980), Bresnan (1982), Grimshaw (1990), Pesetsky (1995), Anagnostopoulou (2003) among others). Crucially, the participle has not lost its verbal properties.[17] If adjectival participles indeed retain their verbal properties, this can explain why they introduce an additional aspectual layer, different from regular adjectives:

(17) a. …dat de wagen (*gisteren) [$_{AP}$ klaar] is.
…that the car (yesterday) done is

b. …dat de wagen (gisteren) [$_{AP}$ [$_{VP}$ gemaakt$_2$]] is_1.
…that the car (yesterday) made is

The combination of the past adverb *gisteren* 'yesterday' and the present auxiliary *is* is ungrammatical. However, when the participle *gemaakt* 'made' is used, this combination becomes grammatical. We suggest that this is the result of the participle introducing its own aspectual layer. If adjectival participles have a verbal core, we expect them to exhibit both adjectival and verbal properties. On the other hand, the truly verbal participle in the 1-2 order is not predicted to exhibit purely adjectival properties.[18] Modification of the adjectival affix *on-*, which is a typical adjectival property, is indeed only acceptable in the order in which the participle precedes the other verb:

(18) het artikel mag worden geretourneerd mits de verpakking <(on)geopend> is <(*on)geopend>.
the article may be returned if the package <unopened> is <(*un)opened>

If we analyze participles as being able to have an adjectival categorial status, we are in a position to provide an answer to the problem that V3-V1-V2 is theoretically predicted not to occur. Non-verbal elements generally appear to the left of the verb in Dutch clauses since Dutch shows an OV-order. We then may take participles that show up as initial elements in a verb cluster to have an adjectival status. In section 3, we discussed two-verb clusters and we saw that the participle in front of the auxiliary verb is possible in the whole language area. Apparently, adjectival status of the participle is a common phenomenon in Dutch dialects. This would then lead us to expect that the order *participle*-V1-V2 will show up in the whole language area as well. This is indeed the case with the exception of the northern part of the language area. The north is predicted to have the order *participle*-V2-V1 given that it strongly prefers V2-V1 to V1-V2. Moreover, it can be observed on map 4 that the order V1-V2-V3 is accompanied by a participle-initial order in all locations.[19] In order to have both interpretive possibilities for the

participle, the initial position must be available. The verbal status reduces the interpretive possibilities of the participle. Consequently, clusters with a participle in a cluster-final, verbal position are expected to constitute a subset of clusters with participles in a non-verbal position.

We thus analyze the V3-V1-V2 order in this construction (4.2) as an instance of the *participle*$_A$-V1-V2 order, and this order is consequently no longer a problem for the theory. If the verb is not adjectival but verbal, it will show up in the V1-V2-V3 order as the rightmost element.[20]

There exists a strong preference for an adjectival status of the participle in the Belgian part of the language area, whereas the Dutch part shows an ambiguity in categorial status. For the northern area it is difficult to determine what the status of the participle is. In the order *participle*-V2-V1 the participle can be adjectival, as is the case in the rest of the language area, but it may also be a verb since the northern part of the language area has a general strategy in which the main verb is the initial element in the cluster. In all the constructions discussed above, the northern area shows a strong preference for V3-V2-V1. Since there appears to be nothing wrong with generating the V3-V2-V1 order through Merge, this is unproblematic (but see below).

In 4.1 it was shown that the order V3-V1-V2 is also highly frequent when the cluster contains two modal auxiliaries, as in *zwemmen moet kunnen* 'swim must can'. With respect to this construction we follow a similar logic as with the participles of 4.2. We argue that this order is due to the fact that the main verb does not show up as a verb but that it may optionally appear in a nominalized form. We then have a structure of the type *nominalization*-V1-V2.

An indication that such an analysis is on the right track is provided by the fact that the V3-V1-V2 order is, as we saw in 4.1, a secondary order. The verb might but does not have to be reanalyzed as a nominal. If the construction *nominalization*-V1-V2 is found in a particular location, the order V1-V2-V3 is available as well. Clusters with nominalized forms constitute a subset of clusters with verbal main verbs. Nouns appear to the left of verbs and, in most varieties of Dutch, main verbs appear to the right of the auxiliaries. It should be noted that the nominalization possibilities in 3V-clusters are geographically restricted. We find this possibility in the middle and eastern parts of the language area, but not in Belgium and Dutch Brabant. We will return to this issue below (section 6.2).

An argument in favor of this analysis comes from the fact that in a sentence such as (1), the verb can be replaced by a pronoun. The sentence *Ik vind dat iedereen **dat** goed moet kunnen*, in which *zwemmen* 'swim' is replaced by the pronoun *dat* 'that', is fine. Such an analysis has been discussed in the literature before (cf. Den Besten & Broekhuis 1989, Evers 2008, Barbiers 2008a). If this is correct, it follows that the order V3-V1-V2 is not a counterexample to our theory of verb clusters. Such an approach is supported by the facts in (19).

(19) a. Ik vind dat ik Jan moet$_1$ laten$_2$ slagen$_3$.
I think that I Jan must let succeed
'I think that I have to let John succeed.'

b. *Ik vind dat ik Jan slagen$_3$ moet$_1$ laten$_2$.[21]
I think that I John succeed must let

c. *Ik vind dat ik Jan dat moet$_1$ laten$_2$.[22]
I think that I John that must let

The sentence in (19a) is of the type discussed in section 4.1. However, the order V3-V1-V2 is not available in this case, as shown in (19b). This can be accounted for by the fact that the causative verb *let* does not allow a (pro)nominal complement, as is shown in (19c). The causative auxiliary *laten* 'let' selects a verbal complement, which forces the infinitive *slagen* to appear as a verb on the right side of *laten* (V1-V2-V3). V3-V1-V2 is unacceptable in this case because the infinitive shows up as a nominalization and thus violates the selection requirements of *laten*.

In section 4.3 we have shown that the order V3-V1-V2 also occurs with the cluster type *zwemmen is gegaan* 'swim is gone' (20a), be it sporadically (only 18 times in the east of the language area). This cluster type has a perfect auxiliary as the highest verb. We think that the low frequency of V3-V1-V2 here is due to the aspectual auxiliary *gaan* 'go'. Like *laten* 'let' discussed above, *gaan* 'go' does not easily allow its verbal complement to be nominalized (20b), and therefore (20a) is highly marked and only seems to occur in transitional zones (see section 6.2).

(20) a. Ik denk dat Jan zwemmen$_3$ is$_1$ gegaan$_2$.
I think that Jan swim.INF is gone

b. *Ik denk dat Jan dat is$_1$ gegaan$_2$.
I think that Jan that is gone

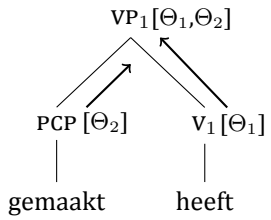
If aspectual *gaan* 'go' resists nominalization of its complement and if, as we claim, V3-V1-V2 does not exist when V3 is verbal, the order V3-V1-V2 *zwemmen is gegaan* 'swim is gone' is expected to be completely impossible, but, as we have seen, it occurs in 18 locations in the east of the language area. This seems to be a distinct construction, however, given that in many of

these 18 locations the directional particle *heen* 'towards' occurs before the main verb (cf. SAND II, map 18b). This makes the construction similar to the standard Dutch construction *uit zwemmen is gegaan* 'lit. out swim.inf is gone', for which no alternative orderings are possible. In these constructions – *[heen zwemmen] is gegaan* and *[uit zwemmen] is gegaan – gaan* 'go' takes a PP-complement, which is the regular type of complement for the verb *gaan*.

We have seen above that the two orders that cannot be generated through Merge do not occur in the dialects of Dutch: V2-V1-V3 and V3-V1-V2. In apparent cases of V3-V1-V2, V3 should be analyzed as adjectival when V3 is a participle and as nominal when V3 in an infinitive.

Our analysis has important consequences for the selection of arguments in the sentence. We follow Neeleman & Weerman (1993) who argue that the theta-grid of a verb cluster is derived from the theta-grids of its parts, via percolation. This means that in a 2.PCP-1 verb cluster, both V1 and the adjectival 2 can assign thematic roles. We illustrate this in (21), which is based on Neeleman & Weerman's example (34), p. 451.

(21)



Following the analysis presented here, DPs that precede the verb clusters are base-generated in that position.

5.3 *The order V2-V3-V1 does not exist (14iv)*

There is another obvious candidate to remove from the set of possible orders in the verb cluster. It concerns the order V2-V3-V1. This order could have been generated through merge by merging the verb projection VP3 with V2 in a cluster [$_{VP2}$ V2-VP3] and then linearize this cluster to the left of V1: [$_{VP1}$ [$_{VP2}$ V2-VP3] V1]. This is demonstrated in the structure in (7c). However, the order only occurs in one of the three constructions under discussion, as in (22). It shows up in 128 locations throughout the language area, predominantly in the Belgian provinces East-Flanders and Antwerp. This order is absent in the other two constructions under discussion, as is demonstrated in (23).

(22) Ik weet dat hij gaan$_2$ zwemmen$_3$ is$_1$.
I know that he go swim is
'I know that he went for a swim.'

(23) a. *Ik vind dat iedereen kunnen$_2$ zwemmen$_3$ moet$_1$.
I think that everyone can swim must
b. *Jan weet dat hij voor drie uur de wagen hebben$_2$ gemaakt$_3$ moet$_1$.
Jan knows that he before three o' clock the car have made must

We might take the systematic absence of V2-V3-V1 in the constructions in (23) to be non-structural. However, it seems plausible to take the perspective that the absence of this order in (23) is not a fact to be explained from a sociolinguistic perspective exclusively. We will provide a structural explanation for the absence of this order. There are three possibilities. We may consider clusters with a perfect auxiliary V1 to have a structural property that allows the order V2-V3-V1 to be generated only in this case. We may take V2-V3-V1 to be generally possible and look for structural reasons why it must be absent in the two constructions in (23). Or we

may find a reason why this order in the sentence in (22) is only superficially an instance of V2-V3-V1. We will take the last approach and try to show that the sentence in (22) does not really count as an instance of V2-V3-V1.

The construction is different from the other two in that the highest verb (V1) is a perfect auxiliary. This auxiliary selects a participle. However, there is no verbal element that is morphologically recognizable as a participle. We might have expected ***gegaan** zwemmen is*, in which case V2 morphologically shows up as a participle. The fact that an expected participle shows up as an infinitive is a well-studied phenomenon in the literature on verb clusters (cf. Wurmbrand 2006 for an overview). It is called the Infinitivus-Pro-Participio or IPP-effect. We do not aim to explain the IPP-effect here, hence the exact formulation of the IPP-effect is not at issue. We assume that V2 is no longer available for V1 to govern the assignment of participial morphology after V2 has been merged with V3. Not V2 (*gaan*) is the participle, but the cluster [*gaan zwemmen*]. We then might take the IPP-effect to be caused by the fact that there is no possibility to assign participial morphology to a syntactically complex cluster.

Whatever the precise formulation of the IPP-effect, we take it that V2-V3 in the V2-V3-V1 construction constitutes a participle. We saw above (section 4.2) that participles are ambiguous in their categorial status. They can have an adjectival status in all varieties of Dutch and be verbal in a substantial number of dialects. The categorial status has consequences for the position of the participle, to the right of the perfective auxiliary if the participle is verbal, to the left if it is adjectival. We thus may take the V2-V3-V1 order to be an instance of a complex adjectival participle followed by the verb *be*, as in [[V2-V3]$_{ADJ}$ V1]. The cluster V2-V3 is generated by merge in the usual way and is categorized as an adjectival complex, in a way

similar to the formation of adjectival participles in general. As a consequence, the adjectival complex occupies a position to the left of *be*.[23]

The participle does not necessarily have an adjectival status, it may also appear as verbal. If the complex participle in this construction is verbal, we expect the complex to be linearized to the right of the governing perfect auxiliary. This leads to the verb cluster V1-V2-V3, which is indeed an alternative option in most of the language area.

Importantly, if this analysis of V2-V3-V1 is correct, we expect a geographic correlation with other constructions involving participles. Earlier (maps 1 and 3) we saw that the orders V1-V_{PCP} and V1-$V2_{PerfAux}$-$V3_{PCP}$ show up in the whole language area except the northern part, and predominantly in the Netherlands part of the language area. This is precisely the geographic distribution we find in the construction $V1_{PerfAux}$-V2-V3 (*is gaan zwemmen*). Apparently the southern dialects have a preference for adjectival participles, and this preference clearly shows up in three constructions under discussion here: V2-V1, V2-V3-V1 with $V1_{PerfAux}$, and V3-V1-V2 with $V2_{PerfAux}$ (see section 6.1 for an analysis of V1-V3-V2). The northern part has a different preference. The decreasing V2-V1 and V3-V2-V1 order is preferred in all constructions there. In those cases the adjectival / verbal status of the participle is not relevant with respect to its linear position. In both cases the participle will appear to the left of the selecting verb.

The next fact to be explained is the lack of the V2-V3-V1 order (with the hierarchical structure [[V2 [V3]] V1]) in clusters with two modals (cf. 23a). The 2-3-1 order cannot arise if V2 and V3 are verbal, as merging V1 to V2-V3 will be necessarily followed by uniform linearization yielding V1-V2-V3. This means that in the order 2-3-1 the element 2, the element 3, or both 2

and 3 would have to be nominal. V2-N3-V1 is impossible, however, as non-verbal elements in Dutch may not follow the verb that they are selected by (see also Zwart 1996). This makes the V2-non-verbal element-V1 order ill-formed for the same reason as for instance the order *bellen op moet* 'call up must'. N2-V3-V1 is impossible too, as nouns cannot select verb phrases in Dutch. Finally, N2-N3-V1 is impossible because nouns cannot select other noun phrases either.[24] A similar reasoning holds for (23b), with 3=participle. Element 3 cannot be verbal or adjectival when element 2 is nominal, as nouns do not select adjectives or verbs as their complements.[25]

5.4 *The orders V1-V2-V3 and V3-V2-V1*

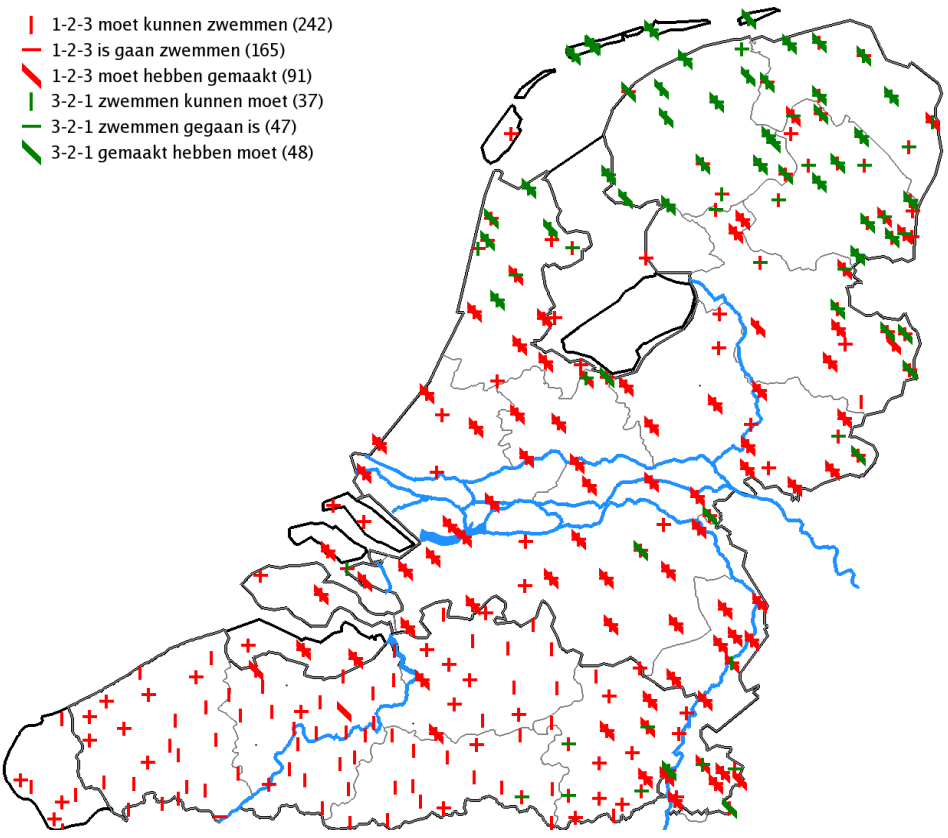
In addition to the 'impossible orders' V2-V1-V3 and V3-V1-V2, we have shown in the preceding section that the order V2-V3-V1 is not a possible verb cluster either. We are left with three 3V-orders to account for. Looking at the different maps, we see that V1-V2-V3 and V3-V2-V1 do occur in all constructions, whereas the V1-V3-V2 is only found on maps 2 and 3. The sentences in (24) provide relevant examples of V1-V3-V2.

(24) a. Ik vind dat iedereen *moet*$_1$ *zwemmen*$_3$ *kunnen*$_2$.
I think that everyone must swim can

b. Jan weet dat hij voor drie uur de wagen *moet*$_1$ *gemaakt*$_3$ *hebben*$_2$.
Jan knows that he before three o' clock the car must made have

c. *Ik weet dat hij *is*$_1$ *zwemmen*$_3$ *gaan*$_2$.
I know that he is swim go

In section 6 we will argue that the order V1-V3-V2 does not exist and that (24a) and (24b) have to be analyzed as instances of V1 - non-verbal material - V2. If we succeed in showing that this is the correct analysis for the V1-V3-V2 orders in (24a,b), we are left with a simple picture. Only the strict ascending order V1-V2-V3 and the descending order V3-V2-V1 can be base-generated. Moreover, there is no optionality in the process since the two orders are in complementary distribution geographically. This is shown on map 5, in which the two orders are compared. On this map, we compare the distribution of the two remaining orders in the three constructions together.[26]



Map 5: V1-V2-V3 vs. V3-V2-V1

We would like to argue that there are two different grammars for the formation of verb clusters: a northern, descending grammar that gives rise to V3-V2-V1 and an ascending grammar V1-V2-V3 for the rest of the language area. There is some overlap in the transition zone between

the two areas and along the border with the German language area but that is to be expected. The remaining order variation is explained by independent principles, which are related to the categorial status of elements in the cluster: the adjectival/verbal status of participles (in combination with the IPP-effect) and the verbal/nominal status of the infinitival main verb.

A question that remains is how to account for the difference between the two grammars. It seems to be the case that the linearization of a merged structure is unidirectional in a particular domain in a particular language.[27] This gives rise to uniform ascending or descending orders within the verbal domain. We argued above that Merge itself does not involve direction. It just consists of the combination of two, potentially complex, nodes. A way to approach this difference is then to posit a principle of the type in (25). This principle applies post-syntactically. If the syntactic module is variation free, a central hypothesis in the Minimalist Program, then the principle should apply at the level of spell-out, PF (which includes the level of Morphology). It makes sense to keep this operation outside syntax proper.[28]

(25) A grammar shows unidirectional linearization in a particular grammatical domain.

In the V-domain, Dutch dialects and Northern Dutch dialects differ in that Dutch dialects have leftward-linearization (the auxiliary (V1) is linearized to the left of the projection of the main verb (VP2), which leads to the main verb final order V1-V2) and Northern Dutch has rightward-linearization (the auxiliary is linearized to the right of the main verb: V2-V1). However, Dutch and Northern Dutch are SOV languages. This implies that in these languages/dialects the object is linearized to the left of the verb (OV). This implies that within the VP domain Northern

Dutch is exactly the opposite of English, in which the object is linearized to the right of the verb (VO) and the auxiliary to the left of the main verb (AuxV). This is shown in (26).

(26) a. Ik denk dat Jan gisteren$_6$ met een roos$_5$ zijn vrouw$_4$ verrassen$_3$ willen$_2$ heeft$_1$ [northern Dutch]

b. I think that John has$_1$ wanted$_2$ to surprise$_3$ his wife$_4$ with a rose$_5$ yesterday$_6$

Dutch is in between Northern Dutch and English in this respect. The linearization of object and verb shows the Northern Dutch order and the linearization of auxiliary and verb shows the English order. The consecutive domains each may have their own direction of linearization. This may lead to different directions in different domains, as appears to be the case in Northern Dutch and English, but not in Dutch which has leftward-linearization in both domains. In all cases we find unidirectional linearization within a domain. In the next section, we will show that the Dutch situation with uniform leftward-linearization leads to interesting consequences.

6. *V1-V3-V2*

6.1 *Participles*

We have argued that participles in Dutch are ambiguous in having a verbal or adjectival categorial status (see section 5.2). We argued that a verbal categorial status would give rise to the order V1-V2-*participle*$_{V3}$ in (27a), whereas an adjectival participle would be ordered to the left of the verbs, and thus leads to the order *participle*$_A$-V1-V2 as in (27b). The northern order

is *participle*-V2-V1 in (27c). However, the order V1-*participle*-V2 (27d) occurs quite often as well, especially in the southern part of the language area (see map 3).

(27) a. ... dat hij de wagen voor drie uur *moet*$_1$ *hebben*$_2$ *gemaakt*$_3$
[V1-V2-PCP] (verbal participle)

b. ... dat hij de wagen voor drie uur *gemaakt*$_3$ *moet*$_1$ *hebben*$_2$
[PCP-V1-V2] (adjectival participle)

c. ... dat hij de wagen voor drie uur *gemaakt*$_3$ *hebben*$_2$ *moet*$_1$
[PCP-V2-V1] (verbal or adjectival participle in northern varieties)

d. ... dat hij de wagen voor drie uur *moet*$_1$ *gemaakt*$_3$ *hebben*$_2$
[V1-PCP-V2]
... that he the car before three o'clock {must have made}

Given the fact that the participle can be adjectival or verbal, there are two ways to explain the occurrence of the order V1-*participle*-V2 in (27d). Either we have to face a problem for our approach since we predict the order V1-V3-V2 not to occur since it involves non-uniform linearization, in violation of the parameter in (22). Or we have to argue that adjectival participles may be merged in between the two verbs. The latter approach is preferable since it is directly supported by the behavior of other non-verbal material within the verb cluster, such as particles, as we will show below.

The fact that verb clusters can be interrupted by particles has received a lot of attention in the literature. Varieties of Dutch differ with respect to the amount and the nature of the material they allow to appear within a verb cluster. Most varieties allow verb particles to appear in the

cluster, as is shown in (28). These particles may be prepositional, adjectival or adverbial in nature.

(28) a. Ik vind dat Jan Marie *moet*$_1$ *OP bellen*$_2$. [part = P]
I find that Jan Marie must up call
'I think that John should call Mary.'

b. Ik vind dat Jan die mug *moet*$_1$ *DOOD slaan*$_2$. [part = Adj]
I find the Jan that mosquito must dead beat
'I think that Jan should kill that mosquito.'

c. Ik vind dat Jan die valse hond *moet*$_1$ *WEG jagen*$_2$. [part = Adv]
I find that Jan that mean dog must away chase
'I think that John should chase away that mean dog.'

The capitalized elements are generally called *verb particles*. This label is just a way to describe a class of elements that together with the main verb forms a complex verbal predicate. There is no evidence for a syntactic category of the type Particle. There is no compelling evidence to consider particles as verbal prefixes either. Particles can be separated from the main verb in verb-cluster constructions and must be separated in clauses with Verb Second. Moreover, they appear outside verbal inflection, as in the case of participles in which the particle shows up in front of the inflectional prefix *ge-*. For sentence (28a) this is shown in (29).

(29) a. Jan belt Marie *OP*. (*Jan *OP*belt Marie)
Jan calls Mary up

b. Ik vind dat Jan Marie *OP moet*$_1$ *bellen*$_2$.
I find that Jan Marie up must call

c. Ik vind dat Jan Marie *moet*$_1$ *hebben*$_2$ *OPgebeld*$_3$. (*ge*OP*beld)
I find that Jan Marie must have called

Often these particles are closely connected to the verb interpretatively. There are even particle-verb combinations that do not exist without a particle, such as *op-juinen* 'encourage', *op-peppen* 'encourage', *op-ruien* 'provoke' *op-hitsen* 'provoke' etc. *Juinen, peppen, ruien* en *hitsen* do not exist as verbs in present day Dutch. The close relationship between verbs and particles has led various linguists to analyze particles as part of the verbs. They are often called 'separable compound verbs'.

A problem for this perspective is that lexical items that are less clearly selected by the verb can also behave as particles. Examples are given in (30).

(30) a. Ik vind dat Jan de hele dag *moet*$_1$ *DOOR werken*$_2$.
I find that John the whole day must on work
'I think that Jan must work on the whole day through.'

b. Ik vind dat Jan de mug *moet*$_1$ *DOOD meppen*$_2$.
I find that Jan the mosquito must dead beat
'I think that Jan should kill the mosquito.'

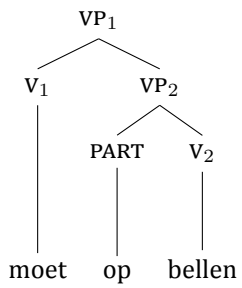
It is not evident that *door-werken* and *dood-meppen* should be considered as complex verbs in the lexicon. *Door* in (30a) is an aspectual adverb, which can generally be added to action verbs, *dood* in (30b) is a secondary predicate with a resultative interpretation.

The literature on Dutch particles is vast. The analyses can roughly be divided into lexical approaches in which verb and particle are part of a lexical verb (a.o. Neeleman & Weerman 1993, Neeleman 1994), syntactic approaches in which particles are generated as separate items in the VP (a.o. Hoekstra, Lansu & Westerduin 1987, Bennis 1991, Den Dikken 1995), and hybrid proposals in which the particle-verb combination constitutes a syntactically complex word (Booij 2002, Blom 2005). All three approaches have theoretical and empirical problems. We will not enter into a detailed discussion of particles in this article. We just establish that this type of particle may easily be incorporated in a verb cluster in all Dutch dialects. This is also evident from the SAND (SAND II, maps 31a/b).

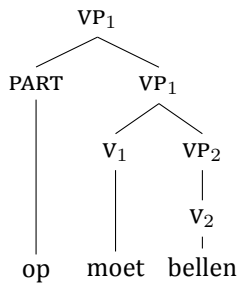
The analysis of particle incorporation is straightforward in our framework. A verb projection may take (an) auxiliary verb(s) to create a cluster that is interpreted as a complex predicate. The verb (projection) may also select a particle to build a complex predicate. The particle may be a lexical item that belongs to the representation in the lexicon, and then cause semantic intransparency and idiomaticity of the particle-verb combination, but it may also be non-idiomatic and transparent, as long as the particle participates in the formation of the predicate. Consequently, we find situations in which an auxiliary verb and a particle are both available for Merge with the main verb. The fact that Dutch shows leftward-linearization (AuxV and OV) for verbal as well as nonverbal material leads to different order possibilities. Either we first merge the particle and then the auxiliary, or we do it the other way around. In the first case, we build a complex predicate of the type *moet op bellen* and in the second case, we build a complex predicate of the type *op moet bellen*. No movement is involved. No incorporation of the particle – the syntactic particle perspective – and no excorporation of the particle in a lexical approach.

We have a syntactic analysis that predicts indeterminacy, and that is what we find. There are no semantic consequences, there are no triggers for movement, we just merge the two structures in (31).

(31) a.



b.



The fact that these two structures only differ in the order in which the particle and the auxiliary are merged to the left of the main verb correlates with the fact that these structures are syntactically and semantically fully equivalent. Just as we argued for the different orders of verbs in verb clusters, the position of the particle within the verbal cluster does not seem to matter interpretatively.

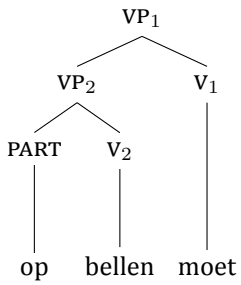
This approach is similar to Bader et al. (2009) (based on Bader & Schmid 2009), who argue that particles may freely appear in any position in a verb cluster as long as it complies with the direction of selection.[29] See also Bennis (1992), who argues that as long as particles are left-adjoined, they can occur anywhere in the cluster.

In northern varieties the auxiliaries are linearized to the right of the main verb (V-Aux) and non-verbal material is linearized to the left (OV). We thus do not expect to find particles within

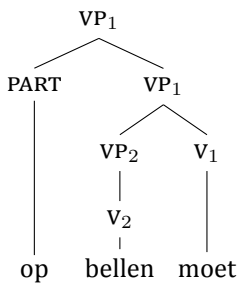
the verb cluster and that is indeed the case. The word order in those varieties is *op bellen moet* and the two orders of merge gives rise to the same surface order. This is demonstrated in (32).

(32)

a.



b.



We are now in a position to return to the verb cluster order V1-V3-V2. Particles and adjectival participles are both non-verbal elements in the predicate and we thus expect them to behave in the same way. Nothing specific for participles in medial position is needed. The derivation of (27d) is similar to the derivation of particle interruption in (31a). This is shown in the structure in (33d). The structures in (33) correspond to the sentences in (27), from the beginning of this section, repeated here for convenience.

(27) a. ... dat hij de wagen voor drie uur *moet*$_1$ *hebben*$_2$ *gemaakt*$_3$
[V1-V2-PCP] (verbal participle)

b. ... dat hij de wagen voor drie uur *gemaakt*$_3$ *moet*$_1$ *hebben*$_2$
[PCP-V1-V2] (adjectival participle)

c. ... dat hij de wagen voor drie uur *gemaakt*$_3$ *hebben*$_2$ *moet*$_1$

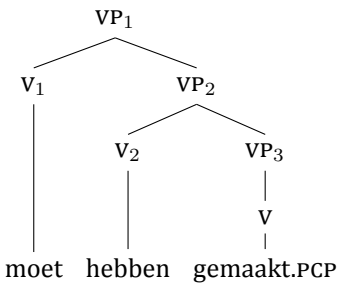
[PCP-V2-V1] (verbal or adjectival participle in northern varieties)

d. ... dat hij de wagen voor drie uur *moet*$_1$ *gemaakt*$_3$ *hebben*$_2$

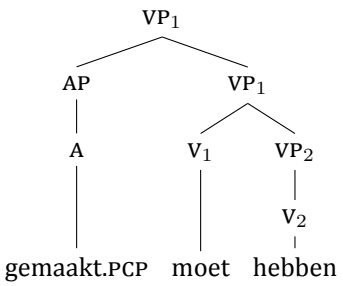
[V1-PCP-V2]

... that he the car before three o'clock {must have made}

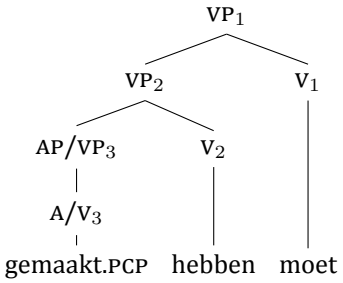
(33)

a. 

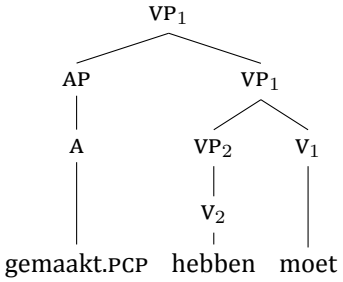
= 1-2-3

b. 

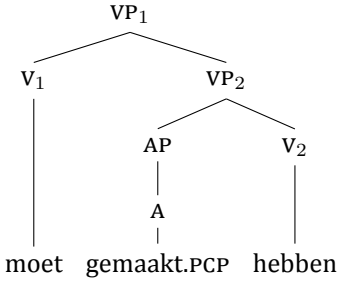
= 3-1-2

c1. 

= 3-2-1

c2. 

= 3-2-1

d. 

= 1-3-2

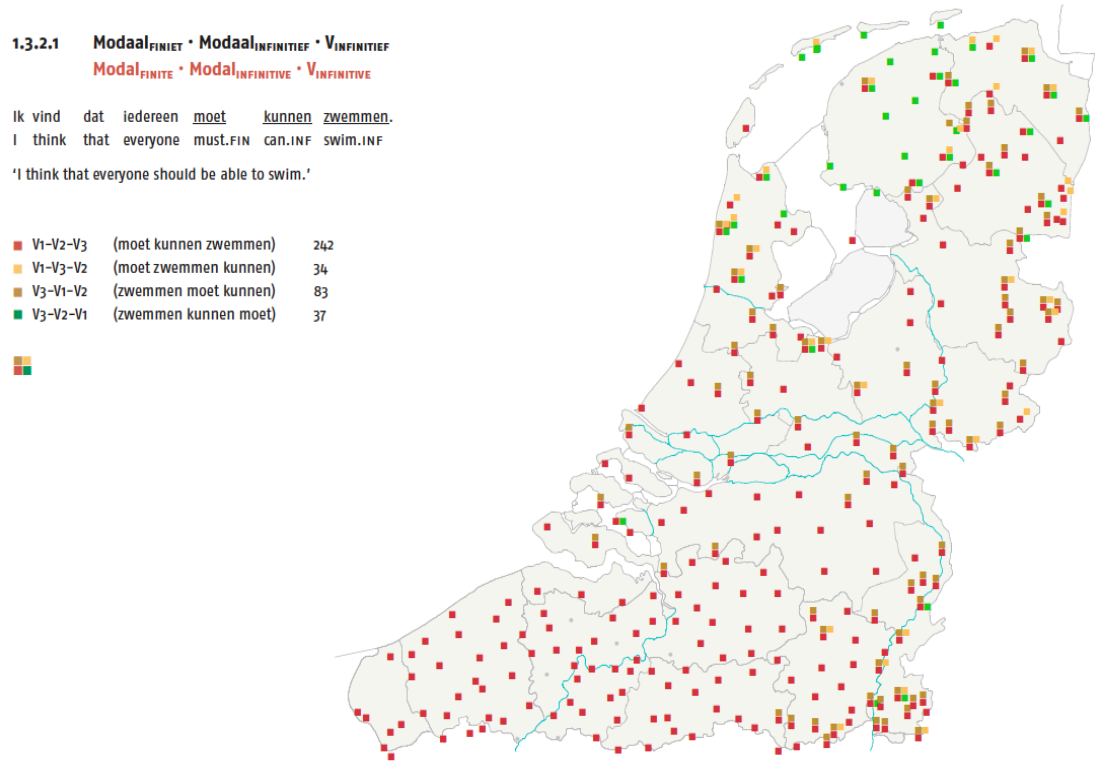
An analysis that assumes the participle to be non-verbal in the 1-3.PCP-2 order can account for the fact that this order is most common in the southern part of the language area. This is the

area where non-verbal material, such as full noun phrases, are acceptable within the verb cluster (SAND-II, map 2.3.1.7).[30]

From map 3 (see par. 4.2) we observe that the Belgian part of the language area behaves special with respect to participles. There are hardly instances of V1-V2-V3 (27a). As we demonstrated in 5.3, this follows from the fact that these dialects show a strong preference to take participles as non-verbal, adjectival elements, either in cluster initial position (27b) or, preferably, in cluster medial position (27d). The remainder of the language area has verbal participles in addition to non-verbal participles, with a preference for cluster-initial participles.

6.2 *Nominalization*

We have argued above that V1-V3-V2 is not a possible order (section 5.4). There were two apparent instances of this order. The first one concerns sentences in which V3 shows up as a participle. We have seen that there is ample evidence that a participial V3 can have an adjectival status, and as such, may occur within the verb cluster (cf. section 6.1), in particular in the southern part of the language area. This leaves us with the explanation of the case in which the V3 shows up as an infinitival. We repeat the relevant map (map 2) below for convenience.



Map 2

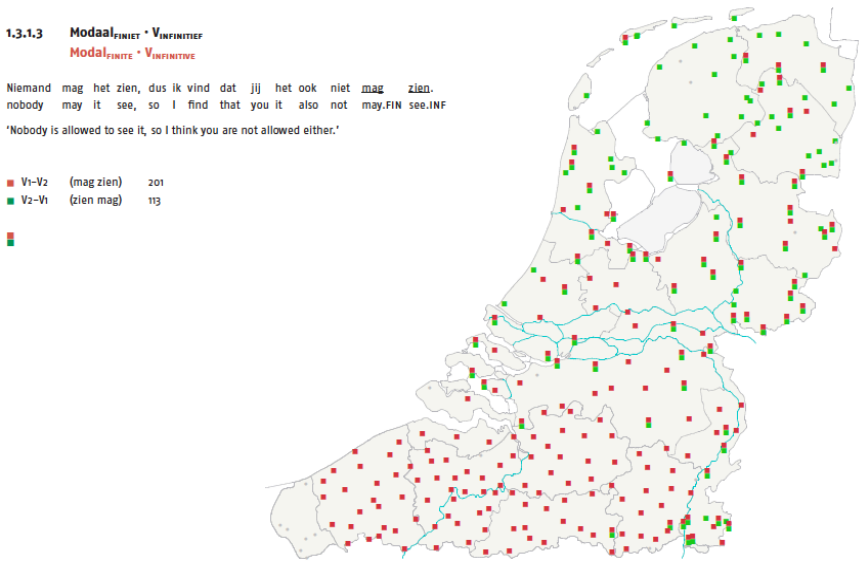
The V3-V2-V1 order in the north and the most frequent V1-V2-V3 order in the rest of the language area are as predicted by our theory. For the other two orders, we observed that in this cluster type V1-V3-V2 (n=34) appears in an almost perfect subset of V3-V1-V2 dialects (n=83), which again is a subset of V1-V2-V3 (n=242). The V3-V1-V2 and V1-V3-V2 orders show up in the eastern/middle part of the language area and in the border area between the northern V3-V2-V1-dialects and the V1-V2-V3-dialects. We argued in 5.2 that there is evidence that infinitives may acquire a nominal categorial status. If that is correct, these nominalized infinitives appear to the left of the verbs in the V3-V1-V2 order, which is the usual position of nominal phrases (OV-order).

However, the V3-V1-V2 order does not occur in Flanders and Brabant. Apparently, Flemish and Brabantish dialects do not easily allow nominalized verbs in these syntactic contexts. They

resist the optional process of recategorization. The rest of the dialects allows nominal infinitives, and some of these dialects appear with the infinitive in cluster medial position. We hence argue that recategorization of infinitives as bare nominal phrases is possible in principle, but restricted geographically.

This analysis immediately predicts the distribution of orders in two-verb clusters with a modal and an infinitive. In section 2, we have shown that two-verb clusters with a modal and an infinitive have geographically determined order possibilities. The sentence that has been tested in the SAND is the sentence in (34). The results are on map 6.

(34) Niemand mag het zien, dus ik vind dat jij het ook niet [*mag zien*] / [*zien mag*]
nobody may see it, so I find that you it also not may see / see may
'Nobody is allowed to see it, so I think you are not allowed either'



Map 6 [SAND II-15b]

We have observed that the northern dialects are V2-V1-dialects, as predicted by their direction of linearization. The southern dialects spoken in Flanders and Brabant are V1-V2 uniformly and the dialects in the east and the middle have two possibilities, either V1-V2 or V2-V1. This can be explained by arguing that all the dialects except the northern ones organize their two-verb clusters as V1-V2, and that Flemish and Brabantish dialects resist recategorization of V2 as a nominal infinitive. The eastern and middle dialects have two available orders, whereas the north and the south have only one, V2-V1 and V1-V2 respectively. We predict that the V2-V1 order is marked with respect to the V1-V2 order in the dialects that allow the two variants. This indeed appears to be the case. First of all, in non-northern dialects the order V1-V2 is attested in almost every dialect, suggesting that the possibility of nominalization is a secondary option. Moreover, we saw in (19) that some auxiliary verbs (e.g. *laten* 'let') do not easily allow nominal complements. We thus predict the order V2-V1 to be marked in non-northern dialects if V1 is *laten*. This is indeed the case, as is demonstrated in (35b).

(35) a. Ik denk dat ik Jan [*laat zingen*] V1-V2

b. ??Ik denk dat ik Jan [*zingen laat*] V2-V1

I think that I Jan let sing / sing let

Although there are no dialect data bearing on this construction available in the SAND, it appears to be the case that (35b) is unacceptable in Standard Dutch.

Given our argumentation in this part of the article, we may expect these nominalized infinitives to appear as non-verbal cluster interrupters as well, just as participles (or particles etc.), giving rise to the order: V1-*nominal infinitive*-V2, as in (36a).

(36) a. Ik vind dat iedereen *moet*$_1$ *zwemmen*$_3$ *kunnen*$_2$.

I think that everyone must swim can

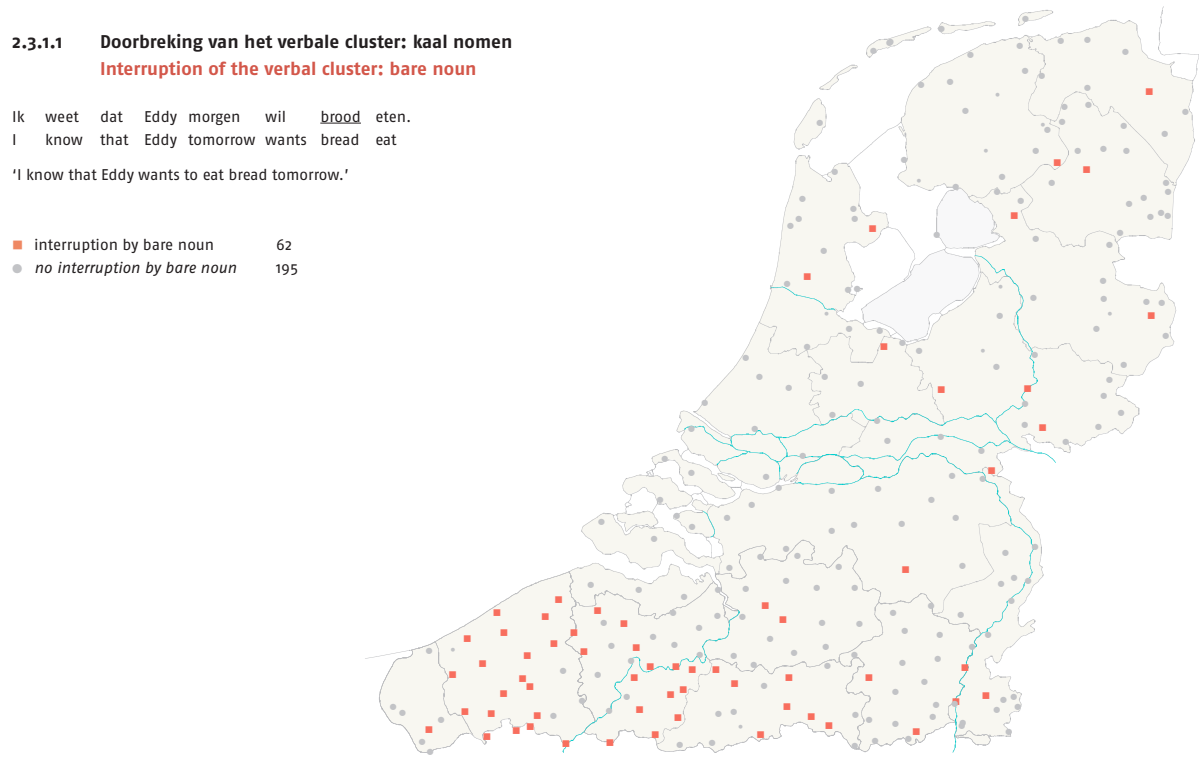
b. Jan weet dat hij voor drie uur de wagen *moet*$_1$ *gemaakt*$_3$ *hebben*$_2$.

Jan knows that he before three o' clock the car must made have

c. *Ik weet dat hij *is*$_1$ *zwemmen*$_3$ *gaan*$_2$.

I know that he is swim go

However, in the construction V1-X-V2 the X can be a particle in 175 dialects (SAND II 31b), a participle in 163 dialects (SAND II-17b / map 3), but a nominal infinitive only 35 times. We attribute this to two causes. First, as we have argued above, infinitives cannot show up as bare nominal phrases in this type of context in Brabantish and Flemish varieties. Consequently, the 1-3.INF-2 is not expected to occur in those varieties that allow cluster interruption most easily. Secondly, nouns usually do not interrupt the verb cluster in non-Flemish Dutch varieties, as illustrated in map 7. As a result, the occurrence of 1-3.INF-2 is also expected to be rare in these varieties of Dutch.



Map 7 (= SAND-II map 28a)

We thus expect the 1-3.INF-2 order to be almost absent in varieties of Dutch, which is not the case. As map 2 illustrates, this order occurs in 34 locations at the border areas between the northern V3-V2-V1-dialects and the V1-V2-V3-dialects and at the border between the Dutch and the German varieties. We will assume this to be a transitional phenomenon. This might explain the fact that this order is not restricted to a certain dialect group, such as Limburgish Dutch, but can be found across different dialect groups, and within those groups only in border varieties. If such an approach is correct, the question arises how the grammars of dialects in these transitional areas can be characterized. A first possibility would be that transitional dialects allow both orders of the neighbouring dialect areas, e.g. if the latter allow V1-V2-V3 and V3-V2-V1 respectively, we should find both V1-V2-V3 and V3-V2-V1 in the transitional dialects. This would be a case of what Chambers and Trudgill (1998) call mixed dialect varieties. However, this cannot be the explanation for the occurrence of V1-V3-V2 (with V3 =

infinitive) in transitional areas between V1-V2-V3 and V3-V2-V1 areas. We would expect V1-V3-V2 to only show up in transitional areas if the neighbouring areas would also have V1-V3-V2. Map 2 shows that this is not the case for the transition zone in North-Holland between Frisian (V3-V2-V1) and Hollandic (V1-V2-V3) and for the transition zone between Frisian and Low-Saxon (V1-V2-V3) in the north east. For the transition zone between the Dutch and German language area we have less data, as detailed information about the word orders that are possible in the western dialects of the German language area is currently missing, although we know that V1-V3-V2 appears to be possible in at least some German varieties. If we restrict ourselves to Standard German the situation is the same as in the Netherlandic transition areas just mentioned: the neighbouring areas have V1-V2-V3 and V3-V2-V1 respectively, while the transitional dialects have one or both of these orders, and in addition the V1-V3-V2 order.

These facts suggest that the V1-V3-V2 with V3 an infinitive is restricted to transitional varieties, and these varieties could be called fudged varieties, following Chambers and Trudgill (1998) , in that they combine two grammatical properties of the neighbouring areas into a distinct, transition-specific construction. They appear to combine leftward and rightward linearization in the verb cluster domain.[31]

6.3 *Summary of V1-V3-V2*

We have argued that cluster interruption interferes with verb cluster building in those dialects of Dutch that linearize verb clusters and VPs in the same direction. In non-northern varieties linearization takes place to the left in both instances (Aux-V and OV). Non-verbal predicative elements may be merged before or after merging an auxiliary. This process gives us the

structures and the orders that are attested in varieties of Dutch. It creates a verb cluster through merge. This is all narrow syntax has to say about verb clusters and cluster interruption.

For cluster interruption by non-verbal material, we argued that there are three interrelated issues that determine the different patterns of cluster interruption in varieties of Dutch:

(i) Participles have an ambiguous categorial status: verbal or adjectival. In Belgian Dutch the adjectival status is strongly preferred;
(ii) Infinitives may be nominalized, except in Flemish and Brabantish varieties;
(iii) Cluster interruption is most frequent in the southwest of the language area.

It follows that the Belgian Dutch and the northern dialects show a rather clear picture. In the northern dialects there are strict V3-V2-V1 / V2-V1 orders in verb clusters and rare cluster interruption (V1-V3-V2). In the south, participles are adjectival (V3-V1-V2 / V2-V1) and infinitives verbal (V1-V2-V3 / V1-V2), and these dialects often have the possibility of cluster interruption (V1-V3-V2). The picture for the rest of the language area is more complicated due to the optionality with respect to the categorial status of participles (adjectival/verbal) and infinitives (verbal/nominal).

7. *Verb cluster intuitions*

We have argued that the variation in the order of verbs can be described with the following three parameters.

(37) Three parameters for variation in Dutch verb clusters[32]

I. A dialect is uniformly {descending/ascending} in the linearization of verbs.

II. A dialect {does/does not} have verbal participles.

III. A dialect {does/does not} have nominalized infinitives in verb cluster constructions.

Support for our grammatical approach comes from a recent experiment, where we tested the intuitions of native speakers of different varieties of Dutch in order to see whether they have systematic judgments about the acceptability of different verb cluster orders, including the orders that do not occur in their own language variety. The goal of this experiment is to test the structural approach to the order in verb clusters developed above.

Theoretically, there are three ways for speakers to judge orders in verb clusters. First, it might be the case that the preferred ordering in a specific language area fully determines the grammaticality judgments. Speakers are confronted systematically with a particular order in their dialect and thus take this order to be the norm. The rest of the orders are all unacceptable given that they do not belong to the input of these speakers.

Second, speakers are aware that other dialects allow different orders. Their judgement is not only determined by the order they are confronted with in their own dialect, but is also related to the orders they are confronted with in neighbouring varieties. These varieties will then be judged to be acceptable as well. We will thus observe geographic patterns in the judgements.

Third, speakers maintain knowledge of the grammatical system. The speaker is equipped with the linearization parameter, which forces him/her to make a choice based on positive evidence. The same is true for the other two parameters in (37). In the case of verb clusters, this perspective leads to the expectation that speakers of dialects will be able to distinguish between

possible orders, i.e. orders that can be generated by the grammatical system, and impossible ones.[33] They thus would judge possible orders, even those that do not occur in their dialect, neighbouring dialects or the standard language, to be systematically better than impossible orders. This implies for instance that a speaker of northern Dutch would judge V1-V3-V2 (the southern order of the construction discussed in 6.1 : *moet gemaakt hebben*) to be systematically better than the impossible order V2-V1-V3 (*hebben moet gemaakt*), although both orders do not occur in the northern part of the language area. We saw in the preceding sections that there are compelling arguments to take verb clusters to be structurally restricted from a theoretical-linguistic perspective. In this section, we construct another argument for a structural approach to verb clusters: the intuition of the native speaker.

7.1 *Method*

The research in this part of the paper deviates from the research in the SAND-project methodologically. We are not so much interested in the judgments of native speakers on the grammaticality of their own language variety, but rather in their judgments of non-native orders. For three-verb clusters this implies that we have tested the judgments for the six logically possible orders. We provided the speakers with these six orders in a written questionnaire, using standard Dutch. More importantly, we didn't ask speakers to provide absolute judgments with yes/no-answers, but we asked them to rank the six possible orders with respect to their relative acceptability. In this approach, we avoided judgments which reflect their own dialect order only. The crucial question is whether the ranking of the six orders would reflect the underlying system or something else.

The experiment for the verb cluster order consisted of two rounds. The sentences presented were similar to sentences that were tested in the SAND-research: *Ik vind dat iedereen* ***moet kunnen zwemmen*** ('I think that everyone should be able to swim'; cf. (1)) and *Jan weet dat hij voor drie uur de wagen* ***moet hebben gemaakt*** ('Jan knows that he must have repaired the car before three o'clock'; cf. (10)). In each round the informants were presented with six sentences that differed in the order of verbs in the verb cluster only. They had to rank these sentences in relation to each other. The informants were told that the sentences presented should not receive special emphasis or focus. They were asked to rank the sentences in a ranking from 1 to 6, even if they considered sentences to be fully unacceptable. Ties were not allowed. Each completed item on a questionnaire received a score: 1 for the sentence with the highest ranking and 6 for the lowest ranking. On the basis of these scores we were able to calculate the mean score for each item by aggregating the scores provided by the respondents.

The test was sent to the Meertens Panel on the internet. The Meertens Panel consists of a group of voluntary respondents of the Meertens Institute. They regularly participate in research by answering digital questionnaires. The respondents are at least 16 years old and live across the entire Dutch language area. 1629 respondents participated in the verb-cluster experiment. Seven respondents were excluded because they were not living in Flanders or the Netherlands at present. Related to the fact that the Meertens Institute is a Dutch research institute, the respondents were mainly from the Netherlands part of the language area. Among the respondents there were speakers of a large number of different dialects.

7.2 *Scores for verb cluster orders*

In figure 1 we present the results of the experiment introduced above in section 7.1 for the cluster types *moet kunnen zwemmen* and *moet hebben gemaakt*.

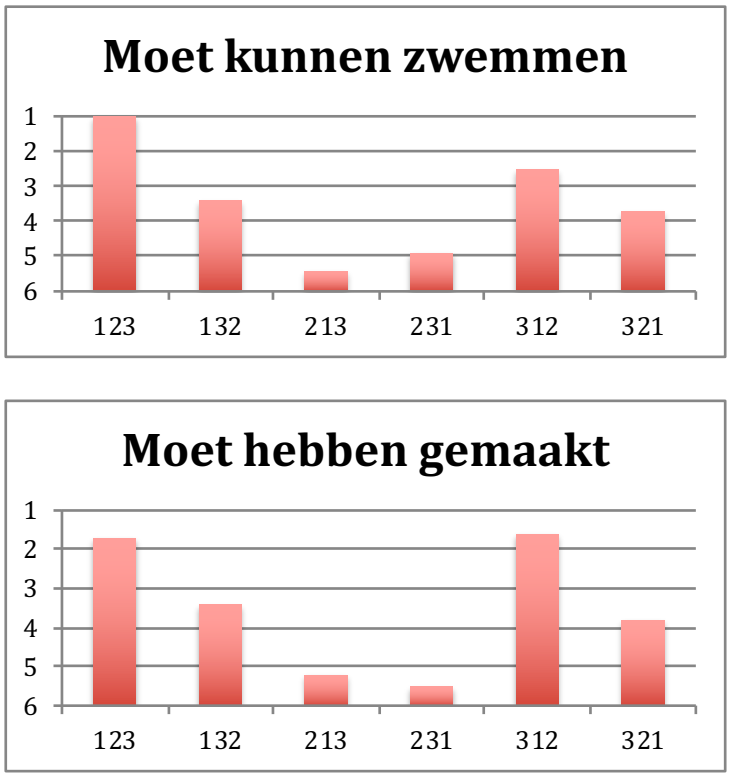


Figure 1: Meertens Panel results

How can we explain the rankings in figure 1? For the cluster type *moet kunnen zwemmen* 'must can swim' the ranking indicates that almost all speakers of Dutch accept the order V1-V2-V3 as the most acceptable one. As we have seen on Map 2 in section 4.1, this order is available in the whole language area, with the exception of the northern dialects. The non-occurring orders V2-V1-V3 and V2-V3-V1 are judged to be the worst orders in the ranking (between 5 and 6). The northern Dutch V3-V2-V1 order is ranked in the middle. Although the verbs can be uniformly linearized in this order, it is not the order of linearization that is found in most of the

language area. The V3-V1-V2 order requires nominalization of the lowest verb. We can explain the high ranking of V3-V1-V2 (ranked 2nd) if we assume that the respondents are aware of this possibility without necessarily using this order in their language.[34]

The cluster type *moet hebben gemaakt* 'must have made' (Map 3 in section 4.2) shows a slightly different ranking. In this case the orders V1-V2-V3 and V3-V1-V2 compete for the first position. Given that we argued above (par. 5.2) that all dialects allow participles to have an adjectival status, the relatively high ranking of V3-V1-V2 is as expected. It is interesting to observe that the order V3-V1-V2 has a higher score in the participial construction (between 1 and 2) than in the nominalization construction (between 2 and 3). This may follow from the fact that nominalization of the lowest verb (V3) is marked compared with the unmarked categorization of participles as adjectival. Again we observe that the non-occurring orders V2-V1-V3 and V2-V3-V1 are ranked lowest, between 5 and 6.

We argue in the next subsections that the ranking patterns are best understood as reflecting the grammatical knowledge of the Meertens Panel respondents (7.4). This explanation is superior to alternative explanations which are based on familiarity with word orders that occur in the Dutch language area (7.3).

7.3 *Familiarity*

Suppose that the grammar did not impose restrictions on the possible orders within a verb cluster, such that all six orders would be equally well-formed grammatically. The rankings shown in figure 1 could then be due to familiarity. Let us first look at the cluster type *moet kunnen zwemmen*. We could formulate the hypothesis in (38).

(38) Familiarity hypothesis (to be rejected)

The more frequent a cluster occurs in the linguistic environment of a speaker, the higher it will be ranked.

The hypothesis in (38) predicts that the rankings should relate to the frequency of occurrence of the various orders in language use. It leads us to expect that the linguistic environment of an individual informant of the Meertens Panel will influence his/her ranking, e.g. informants living in the northern part of the language area, where they often hear V3-V2-V1, should rank this order higher than informants from the southern part where this order is very uncommon. Figure 2 shows that this expectation is wrong.

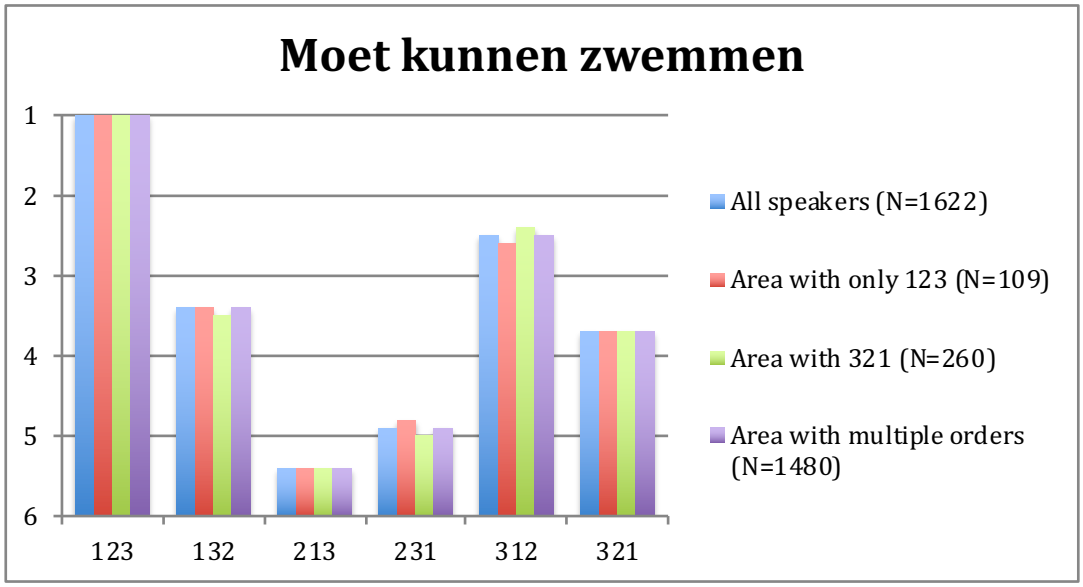


Figure 2: Influence of linguistic environment on rankings *moet kunnen zwemmen*

The Meertens Panel includes both dialect speakers and non-dialect speakers, a state of affairs that could have blurred the picture. However, removing the dialect speakers from the analysis does not make any difference, as figure 3 shows.[35]

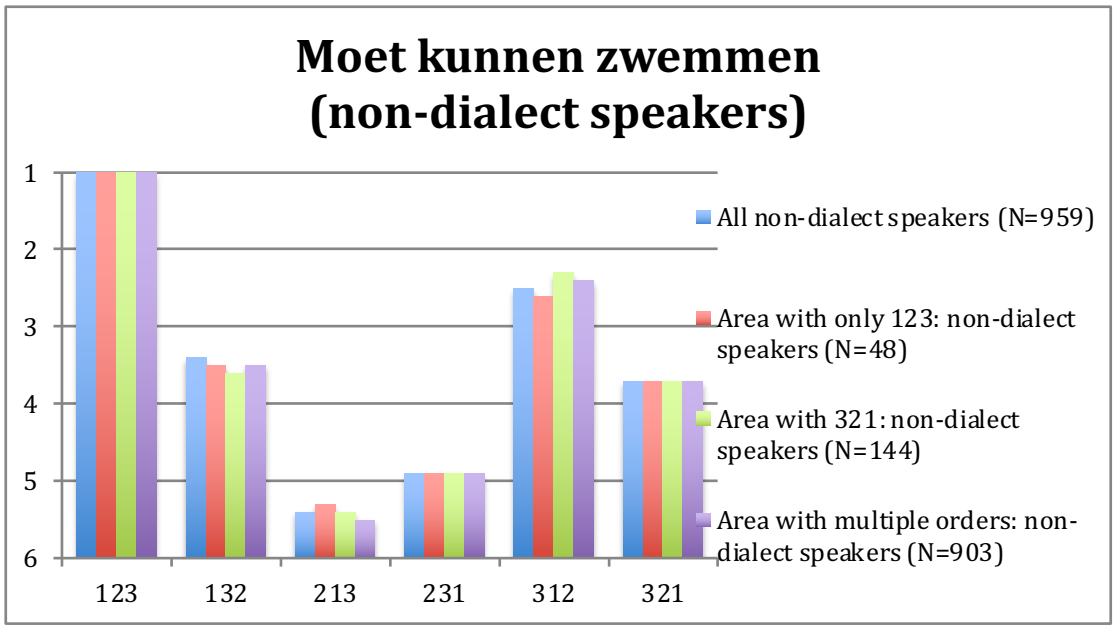


Figure 3: Influence linguistic environment on non-dialect speakers *moet kunnen zwemmen*

An alternative hypothesis, related to the issue of familiarity, would be that figure 3 simply reflects Standard Dutch judgments. This would explain the high rankings of the two orders that occur in Standard Dutch: V1-V2-V3 and V3-V1-V2. The fact that the non-occurring orders (V2-V1-V3 and V2-V3-V1) are judged to be significantly worse than the orders V3-V2-V1 (northern Dutch) and V1-V3-V2 (eastern varieties) remains unexplained under this view.

The situation with the other cluster type, *moet hebben gemaakt*, is very similar. Here the linguistic environment does not have a substantial influence on the rankings either, as figures 4 and 5 show, again supporting our conclusion that familiarity is not able to explain the rankings we find.

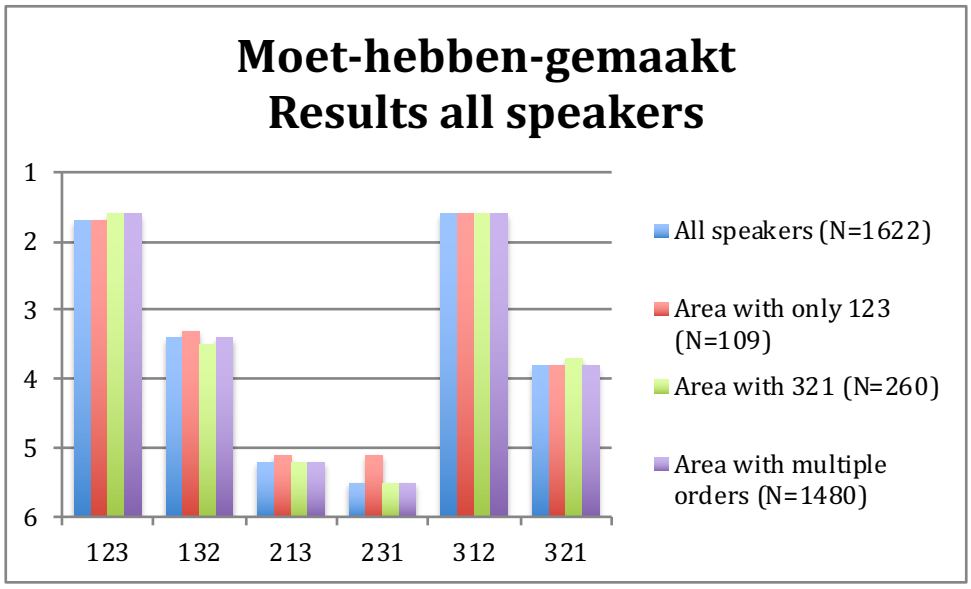


Figure 4: Influence of linguistic environment on rankings

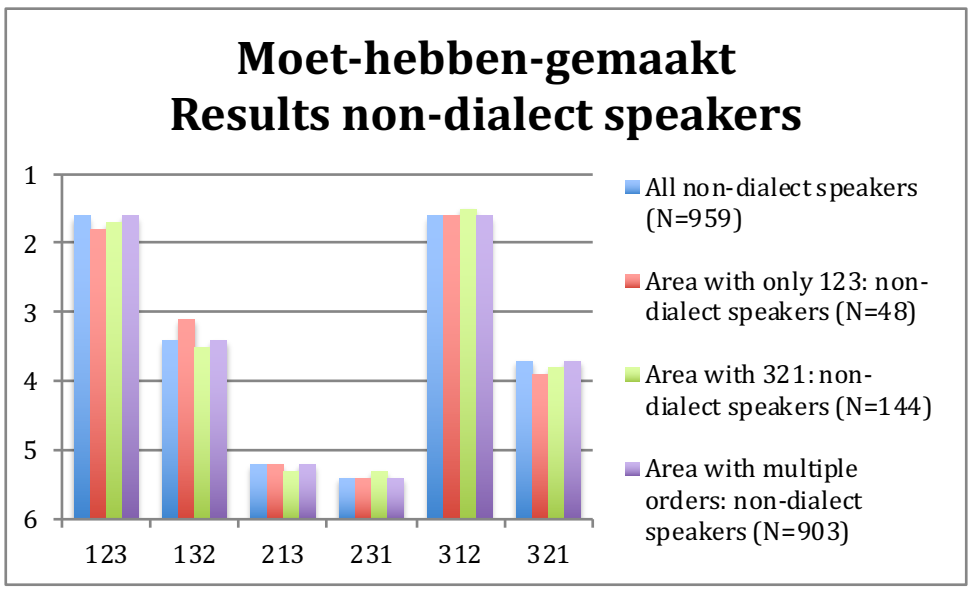


Figure 5: Influence of linguistic environment on rankings non-dialect speakers

We conclude that an explanation that is solely based on the linguistic environment of the speaker (familiarity) does not provide a satisfactory account of the rankings provided by the Meertens Panel (figures 1-5). The hypothesis in (38) turns out to be wrong. These rankings should receive a different explanation.

7.4 *Grammar*

As was argued at the beginning of this section, we expect the grammaticality-judgment rankings to dissociate impossible from possible orders if the ranking order was based on implicit knowledge of the grammatical system. In particular with respect to orders the respondents do not use themselves, we expect them to base their judgments on their grammatical knowledge.

V2-V3-V1 and **V2-V1-V3**

As we have seen, the non-occurring orders V2-V3-V1 and V2-V1-V3 are judged to be worst in our ranking experiment. They both receive an average ranking between 5 and 6. This ranking is only possible if respondents take these sentences to be bad consistently. In our system these orders cannot be derived through merge since we argued that merge is binary and the linearization is unidirectional within the V-domain. They also cannot be derived by changing the categorial status of the participle or the infinitive. Due to the OV-nature of Dutch, those changes would give rise to orders in which V3 is the leftmost element in the cluster.[36] We expect language users to have tacit knowledge of these grammatical conditions. They use binary merge and they know that the verb cluster must be linearized unidirectionally. We thus expect to find these two orders to receive the lowest rankings. As is clear from Figures 2 and 4, there is a substantial distance between the two impossible orders and the orders that are found in the verb clusters under discussion. This appears to imply that the judgments of native speakers confirm our theory for this part of the experiment. They provide their ranking on the basis of their grammar.

V1-V2-V3 and **V3-V2-V1**

Our grammar predicts that the orders V1-V2-V3 and V3-V2-V1 are fully grammatical. This corresponds with the ranking for V1-V2-V3, but the ranking of V3-V2-V1 is considerably lower than the ranking of V1-V2-V3 (cf. fig. 1). The choice between these two orders is determined by a grammatical parameter: unidirectionality in the V-domain can be leftward or rightward. The Meertens Panel respondents (in particular the non-dialect speakers) all accept the rightward setting of this parameter. They rank V1-V2-V3 as the best order. If we assume that the parameter is part of the tacit grammatical knowledge of speakers of Dutch, the respondents should also know that V3-V2-V1 is an option, be it in most cases not a realized option in their own language variety. We take it that the lower ranking of V3-V2-V1 is due to the difference between [possible, realized] for V1-V2-V3 and, in most cases, [possible, non-realized] for V3-V2-V1, i.e. the respondents know that only V1-V2-V3 is part of the standard language. The choice between the two might thus be based on the interference of the standard language. On the other hand, the substantial difference between V1-V2-V3/V3-V2-V1 [possible] on the one hand and V2-V1-V3/V2-V3-V1 [impossible] on the other is solely due to grammaticality.

V3-V1-V2 and **V1-V3-V2**

In our approach, the order V3-V1-V2 involves nominalization of the main verb in the case of *zwemmen moet kunnen* (ranking 2.5 in figure 1; cf. also figures 2 and 3) and an adjectival participle in the case of *gemaakt moet hebben* (ranking 1.6 in figure 1, cf. also figures 4 and 5). Both categorial processes involve grammatical parameters (cf. 23 II, III), so these orders are correctly predicted to be ranked higher than the impossible V2-V3-V1 and V2-V1-V3. The fact that the order V3-V1-V2 with *moet kunnen zwemmen* is ranked considerably lower than the V1-V2-V3 order suggests that the parameter [±nominalization] cuts right across varieties of

Dutch including standard varieties. Map 2 seems to support this idea. The somewhat lower ranking of the V1-V3-V2 order with these verbs is also expected, as this order is impossible in the standard language and only occurs in transitional areas. The fact that this order is ranked higher than the truly ungrammatical 2-1-3 and 2-3-1 orders seems to indicate that speakers know that this order can in principle be derived.

The ranking of the order V3-V1-V2 with *moet hebben gemaakt* is about as high as the ranking of V1-V2-V3 (1.6 and 1.7 respectively). This is consistent with the observation that all varieties of Dutch can have adjectival participles (cf. map 3). So again, we observe that the rankings are based on grammatical availability [possible] together with being part of the standard language [realized]. The intermediate ranking of V1-V3-V2 – rank 3.4 for this cluster type (figure 1) – indicates that interruption by a participle is less acceptable than the order in which this element precedes the verb cluster, this might again follow from interference of the standard language, as this order is not a part of the standard language.

8. *Summary & conclusion*

8.1 *Summary*

We have shown in this paper that the word order variation in verb clusters in the Dutch language area as found in SAND Volume II can be reduced to two truly verbal orders: V1-V2-V3 and V3-V2-V1. In the V3-V1-V2 and the V1-V3-V2 cluster, the main verb (V3) is not verbal but adjectival (in the case of a participle) or nominal (in the case of an infinitive). This approach can account for the geographic distribution of these orders.

Support for the adjectival status of participles in the 3-1-2 order came from the interpretation of these sentences. Support for the adjectival status of participles in the 1-3-2 order came from

the geographic co-occurrence patterns with interruptions by other non-verbal material. Support for the nominal status of infinitives in the 3-1-2 order came inter alia from the order of verb clusters with the causative verb *let*. This verb does not allow nominal complements and the 3.inf-1-2 order is indeed unacceptable with this verb cluster.

The order V2-V3-V1 is exceptional in that it is only possible if V2 and V3 form a non-verbal cluster. The order V2-V1-V3 is unattested. Table 1 summarizes our analysis for each ordering.

Order	**Ascending linearization**	**Descending linearization**	**3 = nonverbal**	**[V2-V3] is a morphological unit**	**3 = non-verbal and interrupts the cluster**
1-2-3	+	-	-	-	-
3-2-1	-	+	(+)	-	-
3-1-2	+	-	+	-	-
1-3-2	+	-	+	-	+
2-3-1	+	-	-	+	-
2-1-3	-	-	-	-	-

Table 1: Summary of the analysis

The order 1-3-2 with 3=participle arises in dialects that allow interruption of the cluster, primarily Flemish dialects. If 3=infinitive in the 1-3-2 order, this does not involve cluster interruption, as Flemish dialects do not allow nominalization of infinitives in this syntactic environment, and the Dutch dialects that allow 1-3.inf-2 do not allow cluster interruption by nouns. We argued that 1-3.inf-2 is a transitional phenomenon. The order 2-1-3 can not be merged at all. The order 2-3-1 is only possible for 2.mod-3.V-1.perf because in that case 2 and

3 form a unit showing morphological agreement (IPP). In the order 3-1-2, 3=adjectival if it is a participle and 3=nominal if it is an infinitive.

8.2 *Conclusion*

With the help of the geographic distribution of the various orders, we argued that an explanation of variation in verb clusters is best captured in terms of an analysis that takes Merge to be the operation that builds verbal clusters. In contrast to most other analysis, no movement operations are involved. The three, partly independently motivated, parameters below are responsible for the superficially huge variation in the Dutch language area.

(i) A dialect is uniformly {descending/ascending} in the linearization of verbs.

(ii) A dialect {does/does not} have verbal participles.

(iii) A dialect {does/does not} have nominalized infinitives in "verb" clusters.

This analysis is supported by geographical correlations between cluster orderings and the occurrence of particles inside a cluster. For example, in the Dutch dialects in Belgium the cluster order V1-$3_{participle}$-V2 is quite frequent, which follows from the strong preference in that area for participles to be adjectival and the fact that most of these dialects allow cluster interruption by particles. Our analysis does not require movement operations to derive such constructions.

The fact that both verb cluster formation and interruption by particles can be seen as instances of the same process corroborates the theory presented here. The only syntactic rule involved is Merge; no construction-specific rules or conditions are required. The fact that the order of the

verbs and the particles in the cluster does not appear to give rise to different semantic or pragmatic interpretations strengthens this approach. For the cluster types under discussion here, we have removed Verb Raising and Verb Projection Raising from the syntax of Dutch without having to introduce new rules or conditions. The only thing that is needed is the assumption that linearization within a domain is unidirectional. The crucial step involves the possibility for Merge to create verb clusters.

To support our analysis, we compared the geographic SAND data with the results of a ranking experiment in which respondents from the whole Dutch language area had to provide a relative ranking of the six logically possible word orders in three-verb clusters. The most important feature of this experiment was that the respondents had to give judgments on word orders that do not always occur in their own language varieties. Strikingly, the rankings of the respondents shows a strong convergence, independent from the dialect area they live in, and thus independent of the dominant cluster order corresponding to that region. This makes it strongly unlikely that their judgments have to do with familiarity.

This shows that these rankings cannot be exclusively explained in terms of familiarity or frequency of use. The syntactic account proposed in this paper provides an alternative and superior perspective on the rankings.

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[1] Versions of this paper have been presented at NWASV2 (Ghent, May 2016), Grote Taaldag (Utrecht, February 2016), Linguistic Variation in the Interaction between Internal and External Syntax (Utrecht, February 2016), Edisyn (Zürich, June 2015) and PLC (Philadelphia, March 2015), Penn Common Ground (Philadelphia, March 2015), MIT syntax square (Cambridge, February 2015), Yale Lunch talks (New Haven , February 2015), UConn Ling Lunch (Connecticut, February 2015), NYU Brown Bag (January 2015), Meertens Instituut T-lezing (Amsterdam, December 2014) and Comparative Syntax (Leiden, December 2014). We would like to thank those audiences for their helpful comments and questions. Furthermore, we are grateful to the reviewers of Linguistic Variation.

[2] For early work on verb clusters in German, see Bech (1955).

[3] It is not our aim here to provide a complete overview of all the mechanisms previously proposed in the literature and to subsequently compare these with our proposal, for two reasons. First, the previous research does not discuss the set of data that we aim to account for, i.e. the geographic patterns. And second, since the existing literature is extensive, this would simply take up too much space. The interested reader is referred to Dros-Hendriks (in preparation), where such a comparison can be found.

[4] Exceptions are Barbiers (2005) and Barbiers (2008a), both based on the set of SAND data also used for the current paper. In Barbiers (2005) movement in the verbal cluster (and elsewhere in the grammar) is freely available if there is an agreement relation between the head of the receiving projection and the moved VP. The optionality of movement and differences in agreement relations in different types of clusters together give rise to word order variation. In Barbiers (2008) this analysis is translated into obligatory, predication driven movement with spell-out options that depend on agreement relations. The goal of the current paper is to dispense with movement in this domain entirely.

[5] Another point is the phenomenon of clause union, as first discussed in Evers (1975), currently known as restructuring. Evers argues that sentences with verb clusters behave as single clausal domains, rather than as a combination of several domains. A simple illustration is that we do not find complementizers and complex temporal domains in clauses with verb clusters. There are no island effects that are caused by the various clausal levels that are presupposed. It seems as if there is one clausal level with various verbs in it. In order to account for these observations, Evers argues that there must be a rule like Pruning, that destroys the base-generated complex structure after moving the head (V) out of the clause by Verb Raising. In the Merge analysis, there is no complexity to begin with. We build a cluster of verbs that behaves as a syntactically generated, complex verb.

[6] According to the modern literature (cf. Wurmbrand to appear-2 for an overview) the size of verbal complements of (modal) auxiliaries may vary depending on the auxiliary involved (roughly: VP, IP, CP). Transparency of such complements then depends on their size. This approach shares with ours that there is no pruning (see footnote 5). Structure is base-generated only if needed and hence minimal. In this paper we will not

try to differentiate between the size of the verbal complements of the auxiliaries under discussion. We will also not attempt to differentiate between the merge positions of the various types of auxiliaries that occur in restructuring constructions, as is done in the cartographic framework (cf. Cinque 2001). As far as we can see, such a differentiation is compatible with the proposal presented in this paper.

[7] For Standard Dutch it is generally assumed that both orders are available for both types of auxiliary verbs.

[8] As is well known, in this type of construction, Dutch has the infinitive *gaan* 'go' instead of the participle *gegaan* 'went', the so-called 'Infinitivus-Pro-Participio' effect, see section 5.3 for discussion.

[9] We interpret the two occurrences on map 4 as noise.

[10] We will come back to these occurrences in section 5.2.

[11] We take the single occurrence on map 4 as noise as well.

[12] Salzmann (2013) discusses some instances of this order in Zurich German, but it is restricted to specific classes of verbs, namely perception verbs, benefactives and causatives. This suggests that these involve a different construction. These verbs were not tested in the SAND project, so we will not discuss this issue any further here.

[13] Unless the analysis contains the mechanism of remnant movement, e.g. Koopman and Szabolcsi (2000). In such an analysis VP3 first moves across and out of VP2, and then VP2, containing the trace of VP3, moves in front of VP1. Special filters are then needed to rule out the surface order V2-V1-V3.

[14] Similarly, participles do appear in adverbial position, as in *de vijand zat verslagen op de grond* 'the enemy sat beaten on the ground', but infinitives do not. As opposed to bare infinitives, *to*-infinitives do occur in attributive positions in Dutch, as in *de te bellen kandidaten* 'lit. the to call candidates, the candidates that need to/can be called' showing that the presence of the infinitival marker *te* 'to' may correspond to a categorial difference (cf. van Riemsdijk 1982, Bennis 1990).

[15] This stative interpretation is known in the literature as a target state. Cf. Koeneman, Lekakou and Barbiers 2011 for recent discussion, diagnostics and references.

[16] More precisely, there is coercion such that *de hele dag* in (15b) has a repetitive, not a durative interpretation, as expected.

[17]An analysis in which participles can be adjectival implies that the verb *hebben* 'have' should also be able to take an adjectival complement. This is correct, as illustrated in (i). See Koeneman et al. 2011 for geographic and grammatical restrictions in this construction.

(i) …dat Jan de hele dag het raam open had.

[18] There is extensive literature on the verbal and adjectival properties of participles (Baker et al. 1989, Embick 2004, Kratzer 1994, 2000 and Reinhart & Siloni 2005, among others). Note that the diagnostics provided in those articles cannot automatically be applied to the cases at hand

[19] V3-V2-V1 in the north, V3-V1-V2 in the rest of the language area, and V1-V3-V2 in the Belgian part. The first two can be analyzed as adjectival participles. We will demonstrate below that the same holds for the V1-V3-V2 order.

[20] In many Highest Alemannic varieties, participles can receive adjectival inflection when they are not sentence-final (Brandner et al. 2016). As Brandner et al note, no definite conclusions can be drawn for the adjectival status of V3 in 3-1-2 and 1-3-2 verb clusters."

[21] Unfortunately, this sentence was not tested in the SAND project, so the unacceptability of this sentence is based on our judgments.

[22] Note that non-causative *laten* (let) does allow a pronoun in this position:

(i) a. Laat dat
Let that
'Do not do that '

b. Ik vind dat ik dat moet laten.
I think that I that must let
'I think that I should not do that.'

c. Ik laat dat aan jou.
I let that to you
'I leave it upto you.'

In these examples, *let* is transitive, and does not have a causative interpretation. Since non-causative *laten* selects a nominal, rather than a verbal, complement, it is acceptable with the 3-1-2, not with the 1-2-3 order:

(ii) a. Ik vind dat Jan voortaan zwemmen$_3$ moet$_1$ laten$_2$.
I think that Jan henceforth swim must let

b. *Ik vind dat Jan voortaan moet$_1$ laten$_2$ zwemmen$_3$.
I think that Jan henceforth must let swim

[23] See also Hinterhölzl (2006: 85), who similarly argues that IPP complements in the 2-3-1 order are participle phrases that have moved into the specifier of the selecting auxiliary.

[24] Pseudopartitives such as *een emmer kersen* 'a bucket (of) cherries' at first sight seem to contradict this generalization. Apparently a noun may select a noun phrase, but only in the case in which the first noun can be interpreted as an indication of quantity (measure phrase) with respect to its nominal complement (Bennis 1979, among others). Bennis (1979) demonstrates that nouns that are not quantificational by themselves are interpreted as quantificational in that position:

(i) a. een zee Amerikanen
a sea Americans
`many Americans
b. een regen protesten
a rain protests
`many protests'

Such a quantifying interpretation seems impossible with auxiliary verbs, which makes an N-N-V construction impossible.

Crucially, there are no other cases in the grammar of Dutch in which a noun can directly select a noun phrase, cf. een boek *(van) Jan 'a book of John' .

[25] A reviewer mentioned that there is nothing that rules out building a complex VP, then adding a nominalizer or adjectival head and finally V1, yielding the 2-3-1 order. We agree that this should in principle be allowed when V1 is a modal, considering the fact that modal verbs allow nominal complements in Dutch, as in (i).

(i) a. …dat Jan een koekje moet.
…that Jan een cookie must
b. …dat Jan dat moet.
…that Jan that must

It is not entirely clear to us why a nominal [V2-V3] complex is not possible in the case of kunnen zwemmen moet `can swim must'.

As for the hebben gemaakt moet (have2 made3 must1), the participial morphology might affect the possibility of analyzing [V2-V3] as nominal.

[26] In Pauwels' (1953) study on two-verb clusters, the descending order was marked green and the ascending one red. Since then, the descending order is called 'the green order' and the ascending one 'the red order' in the literature on Dutch verb clusters.

[27] Williams (2003) and Bader & Schmid (2009) also argue that languages can differ in the direction in which verbs can take their complements. Differently from us, they argue that each verb type can have a different direction of selection.

[28] Approaches in which verb cluster variation is assumed to be a PF phenomenon include Haegeman and Van Riemsdijk (1986), Wurmbrand (2004) and Salzmann (2013).

[29] But see section 2 for some differences with this approach.

[30] See Dros-Hendriks (to appear) for a discussion of why cluster interruption is generally unacceptable in Netherlandic Dutch varieties.

[31] More research is needed for verb clusters in German varieties. The syntactic approach presented in this paper does not immediately predict the 1-3-2 to occur in German varieties, since German has a descending 3-2-1 order. The same applies to the 3-1-2 order, which can also be found in some varieties of German according to Schmid & Vogel (2004) and Wurmbrand (to appear-2). One possibility is that the finite verb has moved to a higher position in the clausal structure. Another possibility is that these varieties have a different direction of linearization. Bader & Schmid (2009) argue that modal verbs in these varieties have a different direction of selection in these varieties, leading to 1-3-2.mod and 3-1-2.mod. This would contradict our claim that direction is a property of PF and linearization is uniform in a single domain. We will not discuss this further, since it is not our aim to provide an analysis of the variation in verb clusters across all Germanic dialects.

[32] In recent work, Jeroen van Craenenbroeck (2016) provides a quantitative-statistical analysis of the two- and three-verb clusters of Dutch dialects found in the SAND-data. He investigates which of many conceivable parameters can best explain the observed variation. Although his approach is different from our analysis in several respects, the results of his parameter system come close to the analysis we have developed so far.

[33] Cf. Barbiers (2005).

[34] The order we find in the rankings is strikingly similar to the order of frequency that is found in the language area on Map 2. We will not discuss here the relationship between the rankings discussed in this section and the frequency in which a particular order is found in the language area (as indicated on the maps in the SAND). We leave this issue for further research.

[35] The diagram only showing the ranking patterns of the dialect speakers (not given here), is very similar to figure 3. This requires further analysis, however, as this set of respondents is heterogeneous (different dialects) and the proportions of speakers of the various dialects should be taken into account.

[36] We come back to the order V1-V3-V2 below.